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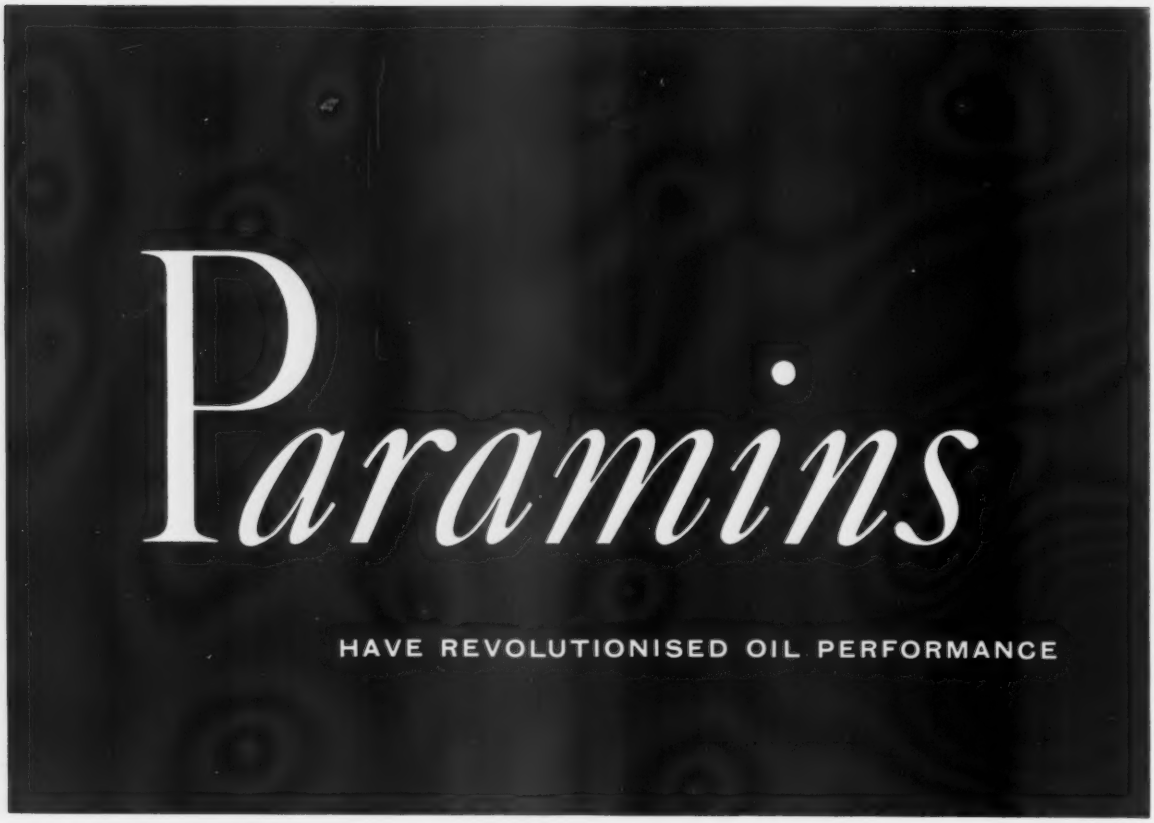

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SCIENCE AND THE STEEL TUBE AGE : 5

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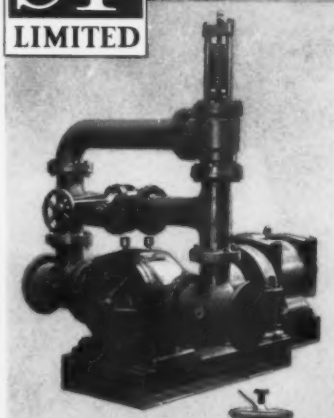

(Left)
Positive Acting Rotary Displacement Pump for the handling of Molasses and viscous fluids, electrically driven through totally enclosed Reduction Gear Box.

(Below)
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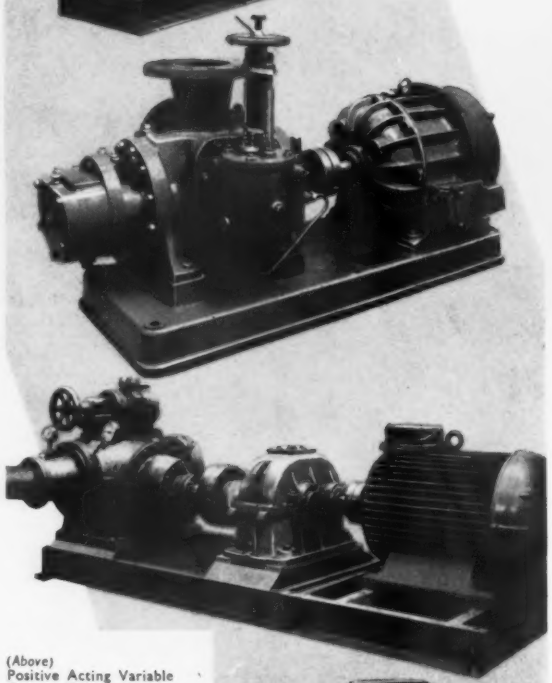
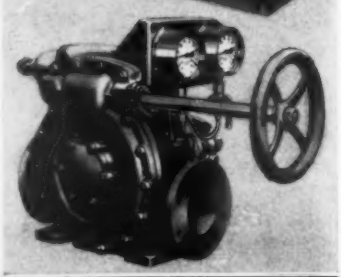


(Above)
Positive Acting Variable Output Guinard Rotary Piston Pump. Electrically driven through Reduction Gear Box, for Oils of varying viscosity.

(Right)
Reversing Flow Rotary Displacement Pump for fitting on tank wagons. These pumps are driven from a power take-off on the gear box.



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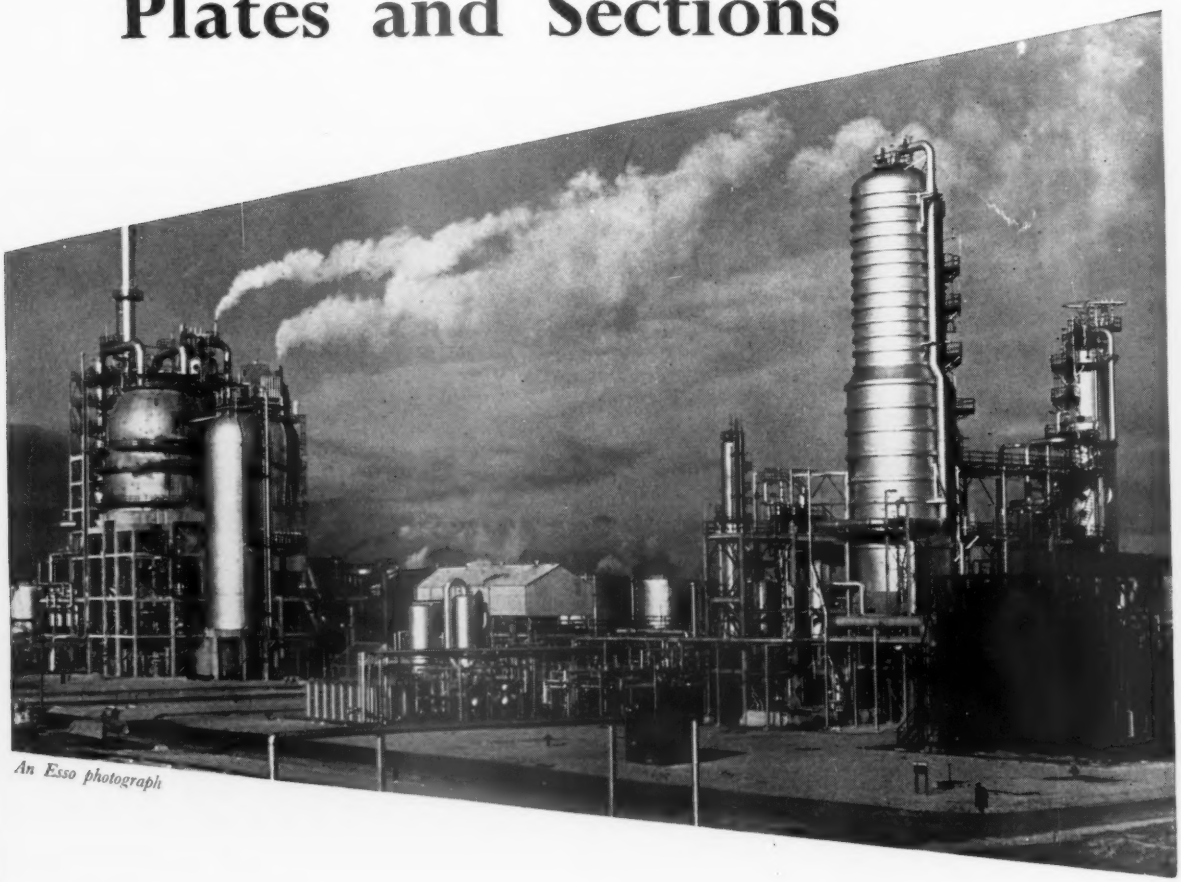

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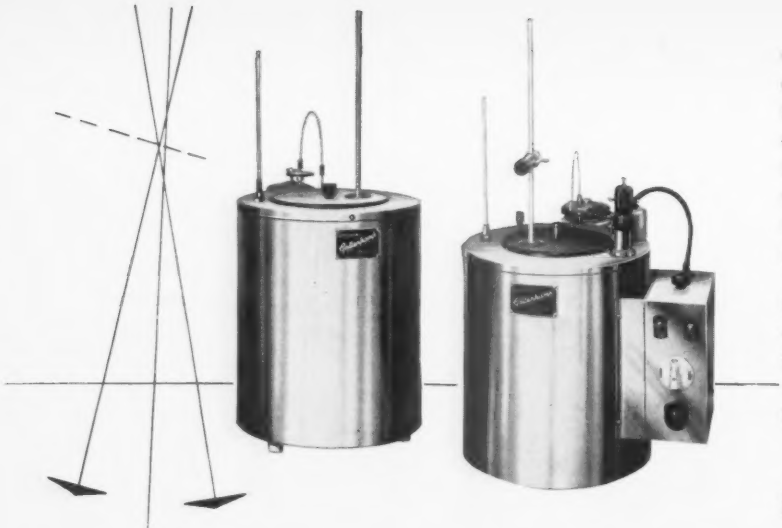

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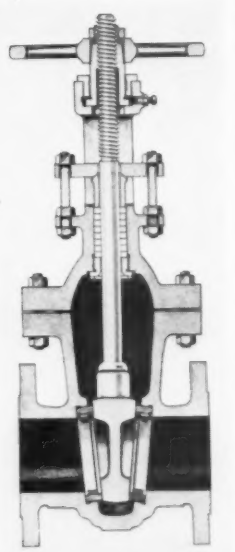
	4	9	15/16	9	6 3/16	1/16	27
	6	11	1	10½	8½	1/16	35¾
	8	13½	1⅛	11½	10¾	1/16	45
	10	16	1 3/16	13	12¾	1/16	53½
	12	19	1¼	14	15	1/16	60½
CLASS 300	2	6½	⅞	8½	3¾	1/16	20¾
	3	8¼	1⅛	11¼	5	1/16	24¾
	4	10	1¼	12	6 3/16	1/16	30¼
	6	12½	1 3/16	15½	8½	1/16	39½
	8	15	1½	16½	10¾	1/16	47½
	10	17½	1⅞	18	12¾	1/16	56¾
	12	20½	2	19½	15	1/16	63¾



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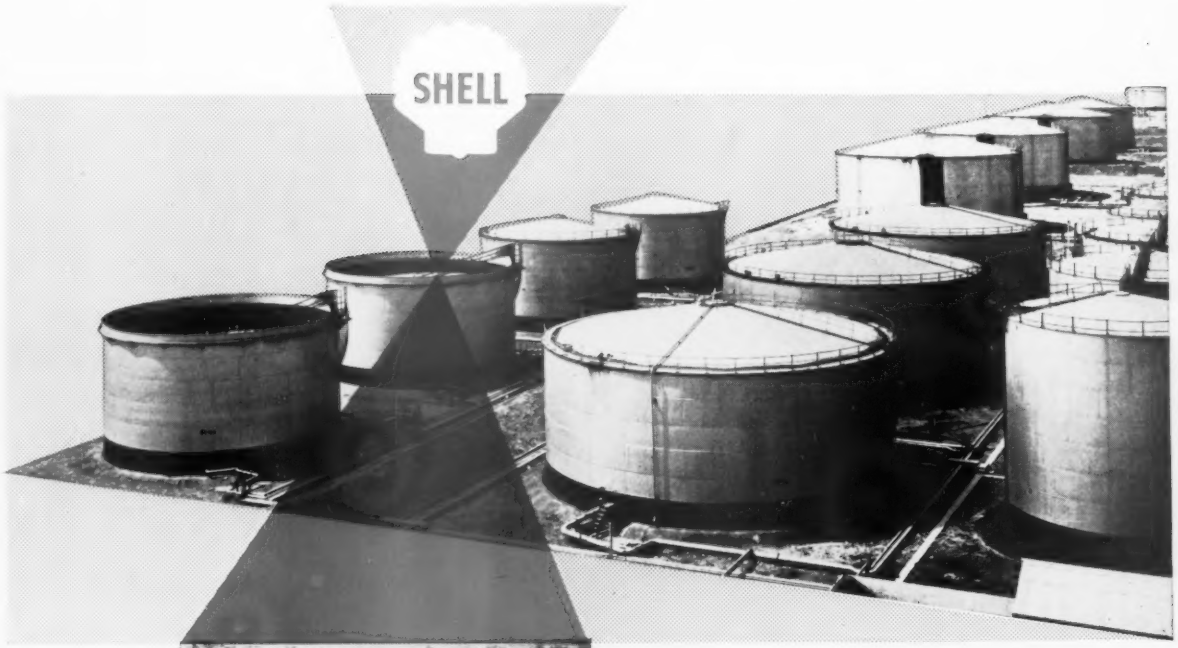

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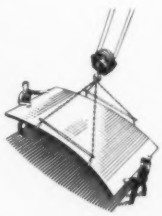

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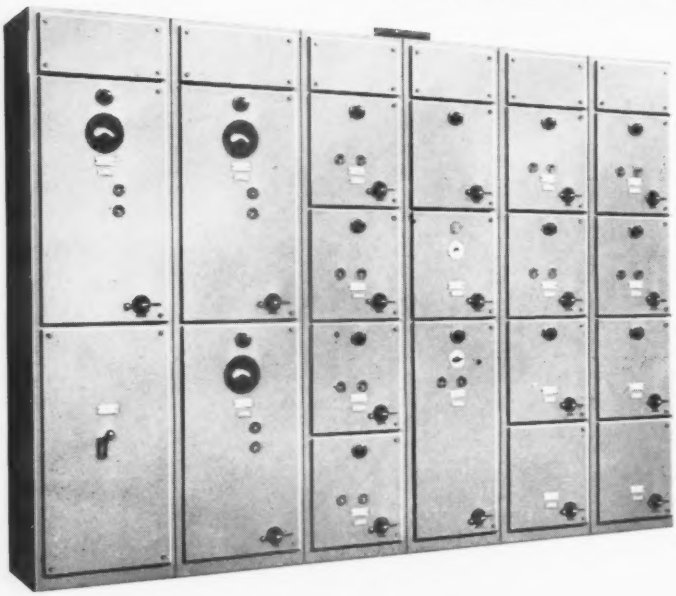

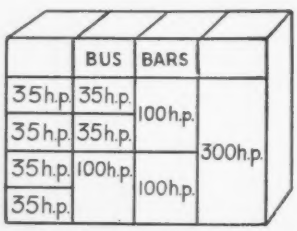

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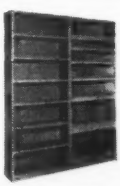

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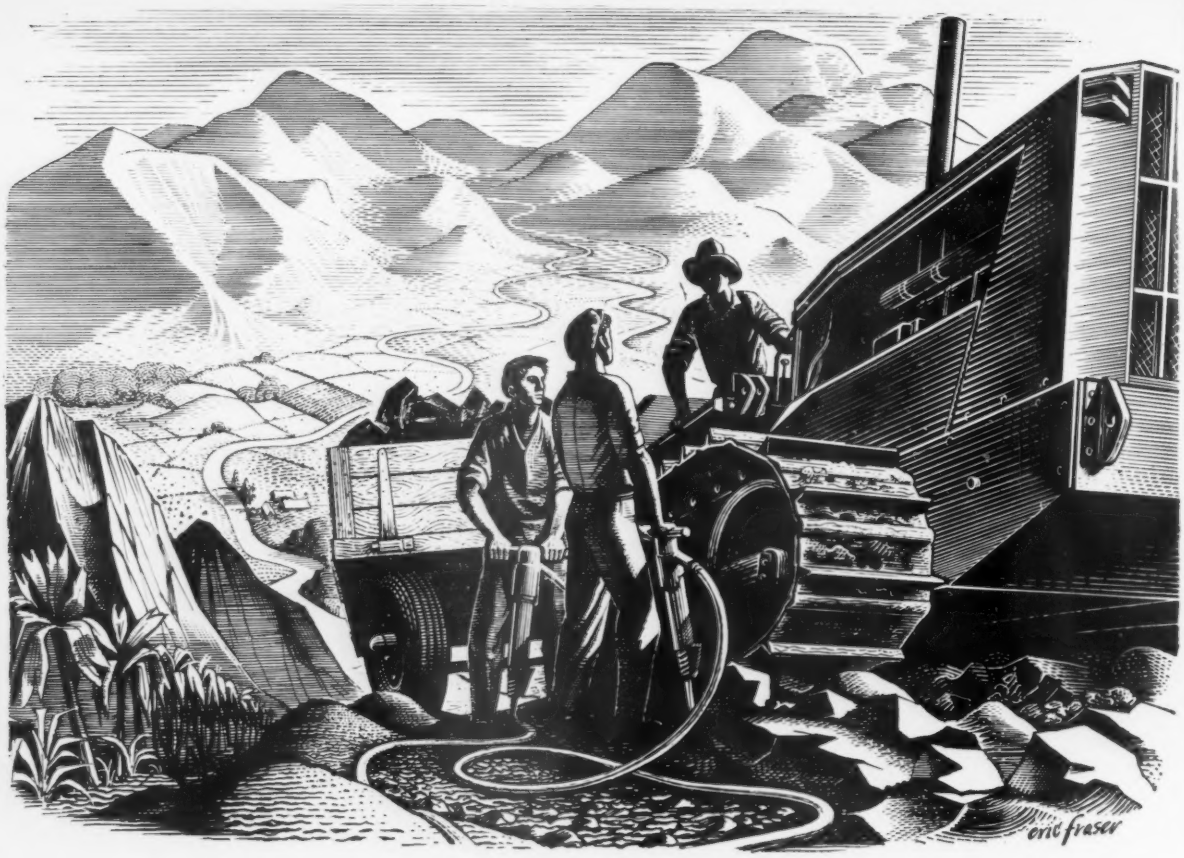

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*Philosophy and Practice of Lubricants Quality Control**

By J. H. HARRIS (Associate Fellow)†

Purchasers, whether they be industrial concerns or individuals, of many products automatically accept an implied standard of quality, particularly where the goods carry the brand of a company of repute or are manufactured either to a minimum standard laid down by Government statute or within limits specified by an organization, such as the British Standards Institution. Whichever organization is responsible for laying down a standard, the consumers have the right to protest should the article clearly be sub-standard as a result of deterioration, contamination, or manufacturing defect. Since the manufacturer, if of repute, is extremely jealous of his commercial reputation, some form of quality control is necessary to ensure that the customer has no justification for complaint.

Basic Oils, Additives

A large refinery in Britain may make up to forty basic oils by distillation and methods of refining. In some cases, particularly of oils used either directly or for blending into aviation lubricants, the control will be largely that of the Ministry of Supply specification. In most cases, however, the refinery will have its own specification control laid down by the organization and in general, apart from the obvious viscosity limit requirement, there will be a colour maximum, flash point minimum, viscosity index minimum in certain cases, and, again in a limited number of cases, an oxidation control which will generally be in terms of the IP 48 method —traditionally known as the BAM. Other special oxidation methods may apply in the case, for example, of turbine oils. Once a particular refinery unit is on-stream for a given feedstock, control to specification does not become a difficult matter and can be largely automatic.

Bulk storage considerably simplifies the testing of a batch, although, on the rare occasions when the stored bulk of a particular grade fails to meet specification, the problem of adjusting it may be aggravated by the size of the bulk.

It may in some cases be necessary to take a calculated risk and to accept a marginal failure to meet the specification. Such a decision would normally be a matter for a central authority in the organization concerned.

The important point that justifies emphasis at the refinery stage of manufacturing lubricating oils is the extent to which instrumentation can control processes and, hence, final quality. The latter receives a final laboratory check.

Basic lubricating oils may pass direct to a final product blending installation or they may be transported to a blending installation elsewhere. In the latter case, it may be necessary to re-check on receipt at the blending installation to ensure freedom from contamination. Since the volume transferred is frequently only a fraction of the total in bulk storage at the refinery, a policy has to be determined on the amount of re-testing necessary. In the case, for example, of oils destined to be used in formulations whose ultimate applications involve considerations of demulsification, oxidation, or electrical resistance, the degree of contamination may be sufficient to create difficulties.

Where aviation lubricants are handled, the framework of handling and testing is settled by the terms of the Ministry of Supply Aeronautical Inspection Directorate (A.I.D.). Ideally, this would provide a standard of handling for all other products, but the A.I.D. requirements are too elaborate to permit attainment of such an ideal.

Other raw materials, such as fatty oils, chemical additives, graphite, molybdenum disulphide, talc, zinc oxide, and elemental sulphur, will demand sampling and testing procedure specific to the product. In Table I typical tests are shown for such products.

The organization of testing and acceptance of materials provided externally to the petroleum industry requires careful thought.

In the case of critical additives it may be necessary to arrange batch manufacture, with acceptance on the basis of

*Read to the IP Northern Branch on 20 November 1956.
†Shell-Mex and B.P. Ltd.

TABLE I

Typical Tests for Non-petroleum Components

Graphite	Ash content Percentage passing 100, 120, and 200 mesh sieves Abrasive material—DTD.806 method
Fatty oils	Specific gravity at 60° F Viscosity—where applicable Pour Point—where applicable Acidity (Neutralization Value) Saponification Value
E.P. additives:—	
Sulphurized	Viscosity Acidity (Neutralization Value) Oil solubility Lead acetate test Copper corrosion Timken O.K. value
Chlorinated	Specific gravity at 60 ¡F Viscosity Chlorine content
Hydrated lime ... ... (Grease making)	Water content Purity Calcium carbonate content

tests on an advance sample. Sampling procedure should ensure the truly representative nature of the advance sample. The alternative to this procedure is the setting of a restrictive specification.

Simple selected check tests are all that is then necessary to ensure freedom from contamination and correct delivery.

Where advance batch sampling is not arranged each delivery is sampled, preferably on the cube root basis, and only in the event of a self-evident major deviation is there any question of quarantine pending investigation.

Where there are many blending installations, laboratory reports on incoming consignments are forwarded to a central control department. With the exception of major deviations requiring immediate attention, testing must be on an historical basis. This infers that any tendency of the product to fall short of a standard regarded as desirable by the central control department, but perhaps not precisely known to the chemists at the installation, must be taken up with the supplier some considerable time after the consignment has been put into use.

Such a procedure is only effective where a deviation trend can be corrected by discussion with the supplier. The alternative is a clear-cut purchasing specification for each product; a major task found in practice to involve far too much work. Where official specifications exist, the matter becomes simpler.

The control of incoming consignments of chemical additives is a problem demanding specific thought. Where they are more or less pure chemicals, such as phenyl alpha or beta naphthylamine, little more than identification is necessary. The only alternative is some form of performance test which, in such cases, would mean an oxidation test.

Reference is made later to the desirability of having a standardized oxidation test of shorter duration than those normally applied. In the case of anti-oxidants this would preferably take the form of a short-term accelerated oxygen absorption test.

For metallo-organic additives, a sulphated ash quantitative determination gives at least some assurance that the concentration level is approximately correct. This is a comparatively tedious method and where a large number of tests have to be performed can be a serious problem. Ideally, a quantitative elemental analysis should be performed and the Ministry of Supply has suggested that metallo-organic additives used on their behalf should be so tested. The conventional methods of quantitative chemical analysis would be out of the question and inevitably some elaborate form of spectrograph seems to be the only solution. To a small company this could mean an impossible expense.

Extreme-pressure additives of the chlorinated and sulphurized type lend themselves to a somewhat simpler quality examination in terms of estimation of chlorine and sulphur content.

Blending of Finished Products

This operation falls into distinct classes—the manufacture of finished lubricating oils, the manufacture of finished lubricating greases, sub-dividing each into products bearing the proprietary brand of the manufacturer concerned, and products made specifically to meet a customer's specification.

The attitude to the two sub-divisions of oils, *i.e.* branded products and customers' specification grades, may need differentiation from the point of view of control. A branded product carries with it the implication of satisfactory service for a particular application, and contained within this conception is the normal spur of competition to give the user the benefit of all progress and research.

Apart therefore from superficial uniformity, the maintenance of which may in itself be a matter of controversy, in many cases it will be necessary to maintain some performance standard.

In such obvious respects as viscosity the minimum deviation from a standard is essential. Interpretation of that minimum varies from the degree of precision expected by the uninformed user to the adoption in some rare cases apparently of limits as wide as those set by the SAE brackets. It has been not uncommon trade practice for several decades to regard $\pm$ 5 per cent of a control figure as a tolerable margin.

In other respects, however, such as colour, the maintenance of uniformity may present difficulties and variations may have to be accepted.

The paramount factor must remain satisfactory performance, though non-uniformity, in comparatively unimportant respects may produce user complaints at the storekeeper level.

The control of quality of branded products will depend primarily on the organization. The design of the blending equipment will be a first factor and a second may be the policy on the holding of a large packed stock versus manufacture against orders and despatch within a prescribed interval.

Taking the procedure to fundamentals, the first necessity will be a set of formulae. Such formulae will comprise traditional formulae which have survived long experience, and new formulae based either on original research or a consumer demand which tends to become common trade practice. In some cases, new formulae may be associated with new types of basic oils.

Outstanding examples in the history of the industry of the latter are given by the change in the period 1925-39, in the conception of I.C. engine lubrication brought about by the availability of solvent-refined oils, at first of medium and later of high viscosity index. The same stimulus effected a complete change of attitude in the lubrication of steam turbines from the Pennsylvanian neutral/brightstock basis to, first, medium V.I. solvent-refined base, later, to the incorporation of oxidation inhibitors, and later still, other additives in high V.I. solvent-refined oils.

In organizations with many blending installations much thought has to be given to the mechanics of operating a central quality control which also has responsibility for issuing formulae. This will involve card indexes and the exchange of cards when a formulae change is made. It implies an arbitrary definition of what constitutes a formula change as some variation has to be accepted on account of slight variations in raw materials.

As the oil industry has generally established formulae on a percentage weight basis it would be helpful if additive manufacturers made their recommendations on this basis.

The type of equipment used for lubricating oil blending will influence the degree of control which can be exercised or that is necessary. However much thought is given to design, once the equipment is in use, difficulties are encountered which would involve complete redesign if this were possible.

The main problems arise in avoiding contamination in pipelines and while it would seem simplicity itself to wash out the line thoroughly, an even more serious problem arises in the disposal of sometimes quite valuable washings.

Though not widely adopted in Britain, but believed to be more commonly used in the United States, automatic blending equipment of the proportioning type may have advantages. It may be ideally adapted to a refinery making a limited number of simple blends or to a blending installation where the total number of grades is limited and the quantities are large. Otherwise, the time and care needed for the accurate setting of the panels negates their value.

Number of Grades

One of the most significant items to be considered in quality control is the number of grades required to be blended at a given installation. It will, first, condition the type of equipment. Analysis of the grades blended will always show that a few are blended in very large quantities and at the most frequent intervals, whilst by far the largest proportion is infrequently blended and then in only comparatively small quantities. There is indeed a moral to be drawn from this, the comprehension of which by lubricant consumers would be greatly appreciated by many in the petroleum industry. The moral is the desirability of considerably reducing the number of grades called for, a reduction which can be effected if so many consumers did not feel that they must have something just slightly different from a material already available.

To illustrate the force of the argument at this point, Table II shows the distribution of gallonage and throughput at a particular blending installation.

TABLE II

Six Months Analysis of Lubricating Oil Throughputs

Range of gallonage per grade	*No. of grades*	*Percentage of total gallonage*
1–250	77	0·2
250–500	25	0·2
500–1,000	50	0·7
1,000–2,500	48	1·6
2,500–5,000	49	3·6
5,000–7,500	25	3·2
7,500–10,000	20	3·6
10,000–15,000	22	5·6
15,000–20,000	14	5·0
20,000–30,000	17	8·9
30,000–40,000	6	4·4
40,000–50,000	6	5·5
50,000–75,000	13	16·6
75,000–100,000	4	7·5
Over 100,000	10	33·4
Total	386	

Some of the difficulties might be overcome by manufacturing and storing large stocks of each grade to meet, say, an annual total of orders. The objections are obvious; storage space is costly and with some products storage deterioration may need to be taken into consideration also; packages involve valuable steel and it is undesirable that this steel should be out of trading use for a lengthy period, trade practice being to use returnable packages which are renovated for a given number of journeys.

Blending Control

In an organization therefore which attempts to meet orders within a given time the flexibility of the blending units, and the pattern of grade throughput, is a factor of overwhelming importance.

In practice some form of docket is issued to indicate that a given blend is to be made and analysing the formula in terms of actual weights of components. Assuming that the blend is one which may be made by simple heating and homogenization, the quantities will be measured into the blending vessel.

Upon the accuracy of the measuring device, whatever it may be, the ultimate necessity for adjustment will depend. It must be remembered that whenever an adjustment is made a sample must be taken and at least the viscosity determined, and so even with the minimum of delay, the occupation of the blending tank is clearly protracted.

Consideration should be given to incorporating in the equipment or having available as a portable apparatus, a viscometric device to give an instant reading for the charge in the tank after homogenization. This must be integrated with measurement of temperature, so that a curve will be available for each grade showing what the viscosity should be over a range of temperatures likely to be reached in blending. If an operator is available on the plant to calculate amounts needed for adjustment, this would save the time spent in testing the sample in the laboratory by standard methods.

Only after attaining the required viscosity need the final sample be checked in the laboratory and in practice the risk of filling before final approval is negligible. A service tank at an intermediate stage would lessen the risk even further.

It is with the additions of non-petroleum products that checking difficulties are encountered. Superficially, if a quantity of material is calculated, accurately weighed, and charged into a blender, there is no reason why, assuming satisfactory homogenizing methods, the result should not contain the total quantity of additive evenly dispersed. In fact, it is not always possible to be sure of this. Operative errors may occur, lines may not clear completely, and the only safe way of making certain that the correct quantity of an additive is present is to check it in the laboratory.

Some safeguard to obviate the necessity for adjustments in additive quantities may be provided by a cross-check on the blending floor, of the type used in pharmaceutical dispensing.

With comparatively simple non-petroleum additives such as fatty oils, laboratory checking is straightforward though time consuming, comparison of the saponification value with that of the fatty oil as received being sufficient.

It is when the anti-oxidant, detergent, and EP additives are considered that the problem becomes more acute. First, most non-petroleum additions are costly and must be used accurately to avoid loss, and secondly, in general, the percentage of additive is a result of performance tests of a greater or lesser degree of elaboration.

It must be assumed that the additive level determined by performance tests at least indicates a significant minimum below which the function of the additives may not be competently fulfilled. A margin must be allowed for blending tolerances but this cannot be wide; apart from the high cost of such additives, an excess may be as undesirable as an insufficiency.

Homogeneity of additive-containing blends, particularly with metallo-organic additives, may be assured by an electrical device which measures differences in capacitance as it is moved through the charge in the blending tank.

Ultimately, however, a laboratory check must be made and, at present, the only simple and fairly accurate method is to determine sulphated ash. This takes 2–2½ hours, and can be related to the sulphated ash content of the additive as received.

For non-metal-containing additives, such as some of the anti-oxidants and EP additives, the only check is by chemical analysis either for elements or for some other quantitative assessment. This can be an extremely laborious task; *e.g.* determination of chlorine in EP oils may take four hours.

It may be objected that, as the purpose of additives is to achieve a certain performance level in the functioning of the lubricant, the real measure of quality control is a performance test. In some cases, *e.g.* anti-foaming additives, the silicones, and anti-rust additives as used in turbine and hydraulic oils, a performance test is the only convenient method by which correct blending can be checked. The amounts of such additives are so small—of the order of 10 to 20 parts per million in the case of the silicones and 0·05 per cent in the case of the anti-rust additives—that it would need micro-analysis methods to determine them.

It is suggested that the industry and the laboratory apparatus manufacturers should collaborate to evolve rapid and accurate methods of determination for metallo-organic and other additives.

Spectrographic apparatus offers one possibility but the high cost would be unacceptable to the smaller lubricant manufacturers.

The problems of oil quality control are by no means at an end when the laboratory has approved the blend. In passage from the blending tank to service tank or filling point, contaminants may be introduced and all lines must be cleared of previous unlike blends by line washing. Also, samples need to be taken at least at start and finish of filling.

In a large plant this means an accumulation of line and tank washings and a serious disposal problem.

Finally, at the filling point, filtration is necessary and the cleanliness of packages must also be considered. A recent investigation showed that even with the most careful inspection it could not safely be assumed that new packages were free from contaminant to a tolerable degree. It is possible that reconditioned packages might have a higher standard of cleanliness.

Lubricating Greases

As with viscosity in oils, the first obvious control for greases is consistency. Here, at least, there is the long accepted penetrometer with its later modifications to give automatic operation.

Water content, acidity, and alkalinity introduce no greater difficulties than with oils, standard methods being available, although there is room for improvement in technique to accelerate the tests and to use automatic apparatus.

In recent years, however, as the nature and behaviour of lubricating greases have been more fully understood, other characteristics, such as apparent viscosity related to pumpability, have assumed importance and have taken their place in specifications, particularly aviation specifications.

Methods of determination of apparent viscosity are still, in Britain at any rate, under consideration for standardization, but the apparatus that has so far had to be accepted by implication from Government specifications is elaborate and, with its accessories for low temperature work, very expensive.

The industry looks forward to some simplification in this test.

Although, except as far as it is self-evident, the significance of mechanical stability in the performance of a grease has yet to be ascertained, there is a growing realization of the importance of that characteristic and at least two fairly well accepted methods of assessment.

In a consideration of perhaps the most important function of lubricating greases, *i.e.* the lubrication of rolling bearings, the determination of mechanical stability as a control test is doubtless important despite uncertainty as to the true significance in performance.

It is, however, the behaviour of the grease as a rolling bearing lubricant that needs to be controlled from batch to batch, and this is proving a major difficulty.

The performance tests which are available for evaluating lubricating greases in rolling bearings are lengthy to perform, as indicated in Table III, and apart from the work on standardization which is now in progress under the auspices of the IP, there is doubt as to their precision. Ample evidence is now available to show that a number of factors other than the quality of the grease may account for failures in such tests.

TABLE III

Ball and Roller Bearing Rig Tests

	Hoffmann high-speed rig	*Ransome & Marles MRJ 4E rig*	*SKF R2 rig*	*H.T. performance test DTD.825A, etc.*
Type of bearing	MTS 14 1¾-inch bore ball	MRJ 4E 4-inch bore cylindrical roller	22312. 60-mm bore, double-row, spherical roller	BRL.020 20-mm bore
Test speed rev/min	4,000	2,000	2,500	10,000
Duration	500 hr	1,000 hr	Condition 3 480 hr	1,000 hr

Although every attempt is made to control raw materials and processing, there is still a doubt as to whether the final product will be uniform in rolling bearing performance from batch to batch, and it is clear that since the performance tests mentioned take weeks they can only be used as type formula tests; it is therefore necessary to have either a rapid performance assessment—taking no more than an hour or

two—or give a greater degree of urgency to research on the fundamental parameters of lubricating grease behaviour in rolling bearings to relate these to comparatively simple and rapid—preferably automatically instrumented—laboratory tests based on, say, consistency, apparent viscosity, and mechanical stability.

It is not within the scope of this paper to discuss the value of EP greases for the function for which they are normally used—lubrication of rolling bearings under extremely heavy loads, as in rolling mills—though one school of thought does suggest that EP additives are unnecessary for this function. Nevertheless, as specifications exist in which this determination is required, arrangements are necessary for it to be made and the machine commonly used in Britain is the Timken Wear and Lubricant Tester.

A great deal of attention has been given to standardization of technique, as this can greatly affect the results. In some cases the interpretation can be subjective, always an undesirable feature of a test. Again, the apparatus is very expensive and one requirement of the specification demands the full attention of the operator for two hours, which is a great strain. The aim should be to have an apparatus which leaves the operator free to carry on with other work.

This test is in the nature of a performance test and, as before, it would be desirable to substitute simple laboratory tests involving little time and automatic apparatus.

The amount of thought and work that has heretofore been given to control tests for greases has naturally been considerably less than that given to oils, largely because of the comparative complexity of the product which also makes accurate sampling more difficult. Furthermore, the problem of avoiding contamination in greases is more acute than for oils since at the ultimate stage the product is in its most difficult state for filtration. Much further thought requires to be given to this aspect of manufacture and control.

Consumer Specifications

It is understandable that any large organization, particularly if it is concerned with spending public money, should wish to purchase as many products as possible to specification.

The drafting of a specification must obviously ensure that the product is suitable for the function or conversely that no product could meet the specification and be unsuitable for the application. This negative aspect is perhaps even more important and taxing to the draftsman's ingenuity.

The specification must also be so drawn as to permit the widest competition and the cheapest product that will perform without failure. Consideration must also be given to less tangible factors such as length of service of the products before replacement. This is an important consideration in, for example, internal combustion engine oils.

Outside Government Departments, few consumer organizations have the knowledge and facilities for drafting specifications for lubricants which will meet all the requirements indicated above, since it is naturally inferred that field experience must be used to guide specification details as well as intimate knowledge of the product.

It is therefore not unusual to find the large consuming organization requesting the assistance of the petroleum industry in drafting a specification.

The general issue of consumer specifications has been dealt with at a very advanced mathematical level (*J. Inst. Petrol.*, 1956, **42**, 105) but from the customers' point of view the object is to obtain security of use with the greatest economy. These requirements may tend to be mutually contradictory and the balance may have to be struck between unnecessary restrictiveness to obtain security and undesirable elasticity to obtain low-priced material.

As many in the industry know, consumer specifications may be drafted in very odd ways. Some, in fact, cannot be met at all because of a conflict between the viscosity index requirement and the actual viscosities laid down. Non-standard methods have been incorporated which, apart from involving hours of laboratory work to evolve the right technique, have generally resulted in arguments on interpretation of results, apart from some specifications whose wording leaves the greatest doubt as to what is intended. Fortunately, however, these are rapidly becoming less and when the help of the potential supplier is invoked such anomalies can, at least, be prevented and the specification made realistic.

Inevitably, however, the ultimate responsibility for the correct application and satisfactory behaviour of the lubricant purchased against such a specification must depend on the user, who thereby denies himself the benefits of individual progress by the manufacturer in an industry which is noted for its progressiveness. It is commercially understandable that the manufacturer of lubricants with very often a large investment in research can only incorporate the results of that research in branded products. Again, many of the larger manufacturers of lubricants have unrivalled service facilities which are made available freely to the user of branded products. These can hardly be invoked when difficulties arise in the use of grades supplied only to customers' specifications.

In general, when specifications of this nature are employed by the consumer supplies are invited by open tender. In practice, this results in a battle of wits between the potential suppliers to meet the specification at the lowest possible cost. If the specification has been well drafted, the consumer may obtain every satisfaction but in the other event the lubricant supplier can hardly be blamed if his greater knowledge of the available basic materials enables him to supply a very cheap product which meets the specification but which is not to the user's ultimate satisfaction.

It is not perhaps fully understood by consumers that a tender involving a lubricant specification very often requires a great deal of laboratory and clerical work on the part of the lubricant supplier and there seems to be a "tender season", October and November representing the peak of the season, with a view to supplies commencing on the first day of the New Year.

Since it is impossible to expand laboratory and clerical facilities to take care of the very large influx of tenders at such a time, conditions sometimes become almost insupportable. It is necessary therefore for the customers to adopt a greater measure of understanding of this situation.

This measure of understanding can be granted at least in the form of the longest tolerable period in which to deal with the tender. A week is absurdly insufficient in the case of a tender involving a number of grades where, for example, tests by IP 48 have to be made, since under normal working conditions this takes three days.

The amount of work which has to be carried out before a tender may be completed will depend very much on the specification involved and the experience and ingenuity of the lubricant manufacturer's staff.

Methods are available for approximately calculating the proportions of the simpler blends and, in some cases, it is even safe to quote on such a basis without having laboratory

TABLE IV

Customer		*A*	*B*				*C*			*D*		*E*	
Grade		*SAE. 20*	*SAE. 10W*	*SAE. 20*	*SAE. 30*	*SAE. 40*	*Premium*	*HD*	*Straight*	*SAE. 10W Premium Petrol*	*SAE. 10W HD Diesel*	*Summer*	*Winter*
Viscosity at	70 F						450 sec (max)	1050 sec (max)	1450 sec (max)				
	140 F	95–110 sec					86 sec (max)	135 sec (max)	165 sec (max)	15·0–17·0 cS	15·0–17·0 cS	39·0–42·0 cS	22·0–26·5 cS
	200 F		40–43 sec	47–53 sec	60–64 sec	79–82 sec	48 sec (min)	56 sec (max)	62 sec (max)				
	210 F	46 sec (min)								5·6 cS (min)	5·6 cS (min)	11·0 cS (min)	7·8 cS (min)
Viscosity Index ...		90 min	90 min	85 min	85 min	85 min	100 min	100 min		85 min	85 min	90 min	90 min
Flash Point F ...	Closed	400 min	360 min	400 min	425 min	425 min	400 min	400 min	400 min	340 min	340 min	400 min	400 min
	Open		370 min	410 min	435 min	435 min							
Fire Point F			410 min	460 min	490 min	490 min							
Inorganic Acidity ...			Nil	Nil	Nil	Nil							
Organic Acidity ... (mg KOH g)		0·10	Nil	Nil	Nil	Nil	0·10	0·10	0·10			0·10	0·10
Saponification Value ... (mg KOH g)			1·0	0·5	0·5	0·5							
Pour Point F		0 max	0 max	5 max	5 max	5 max	10 max	10 max	15 max	– 5 max	– 5 max	15 max	0 max
Ash % wt		0·005 max	Nil	Nil	Nil	Nil	0·005 max	0·005 max	0·005 max			0·005 max	0·005 max
Carbon residue ... (Ramsbottom) % wt		0·3 max	0·1 max	0·2 max	0·3 max	0·4 max	0·3 max	0·3 max	0·3 max			0·5 max	0·3 max
Hard asphalt % wt ...			Nil	Nil	Nil	Nil	0·005 max	0·005 max	0·005 max			Nil	Nil
Oxidation ... ... IP 48	Carbon residue increase (% wt)	0·6 max	0·6 max	0·6 max	0·6 max	0·6 max						0·7 max	0·6 max
	Visc Ratio	1·5 max	1·6 max	1·6 max	1·6 max	1·6 max	1·5 (at 140° F)	1·5 (at 140° F)	1·5 max			1·5 (at 140° F)	1·5 (at 140° F)
	Asphaltenes	0·05 max	0·3 max	0·05 max	0·05 max	0·05 max						0·2	0·2
Additive level			Additive percentage specified				Type specified	To BS1905			DEF. 2101A		

determinations made in confirmation. In general, however, particularly where oxidation tests are included in the specification, laboratory determinations must be made, bearing in mind that if the lubricant supplier wishes to obtain the business, he must be competitive and is therefore forced to work to the uttermost limits of the specification.

In view of the tendency in industry for a multiplicity of specifications for identical functions it is suggested that a considerable measure of rationalization would be in the interests both of the supplier and the consumer.

Ellis, in a series of articles in *Scientific Lubrication*, has performed an extremely valuable service both to the industry and to the consumer in drawing attention to the question of specifications. He asserts that "Perhaps in some ways the position of the supplier has been unduly handicapped by a diversity of requirements defined in many individual ways."

Again, not only the supplier but ultimately the consumer would benefit by an agreement on unification of specification between organizations interested in specific classes of lubricants. For example, I.C. engine oils are required by almost

every industrial organization. If, say, the transport undertakings who have their own associations were to adopt some common standard, the industry would be spared the state of affairs which is revealed in Table IV.

The basis for such agreement, apart from the almost identical nature of the service, is already possible in terms of the performance standard laid down in, say, BS 1905 and the U.K. and U.S. Service Specifications.

This is already clearly recognized, together with the considerably improved performance offered by the use of detergent/dispersant/anti-oxidant additives but, as can be seen, individual attention demanding a great deal of technical man-hours still has to be given to tenders which unification of specification could eliminate.

The so-called Air Ministry Oxidation Test (IP 48) is one of the outstanding bottlenecks. It was first introduced in 1928 in the original DTD.109 specification for aircraft engine oils, at that time concerned only with piston engines.

To what extent correlation was obtained between the results of this test and the performance of the oil in the engines of that period, bearing in mind the types of oil then available from refineries, is presumably on record in the Air Ministry files.

It requires two periods of six hours on consecutive days with a standing period of 12 to 18 hours between. Fifteen hours must elapse after completion of the second 6-hour period before determination of the properties of the oxidized oil, so that three working days in a normal laboratory must elapse before the test can be completed.

If this period is related to the competitive nature of tendering, which may require examination of three or four blends against a specific item in order to find the cheapest, some idea of the extent of work necessary may be obtained.

It should not be overlooked that even with a multiple bath, the amount of testing so required, together with any other routine quality control testing to IP 48 which is in progress, may place a severe strain on the laboratory resources, especially as at least duplicate tests are essential.

The industry has so come to accept the Air Ministry Oxidation Test as a convenient (or inconvenient) method that it is in danger of overlooking whether it has any real significance.

The Air Ministry, under pressure of engine development, realized that the significance was at least limited and in D.Eng.R.D.2472, the current Ministry of Supply Piston Aircraft Engine Lubricating Oil specification, the requirement is omitted and replaced by a type performance test. The precision of the test is that results of duplicate tests should not differ by more than the following amounts:—

Viscosity ratio	*Repeatability* % *of mean*	*Reproducibility* % *of mean*
Up to 1·75	14	20
Above 1·75	20	30
Increase in carbon residue		
Up to 1·0	14	20
Above 1·0–2·0	20	30
Above 2·0	Limits have not been established.	

When this precision is considered, doubts about its value greatly increase. It is therefore desirable that in the appropriate quarters a great deal of thought should be given to displacement of this test by a simpler, more rapid, more significant method.

It is not suggested that the industry should enter further into what Ellis has termed the "expensive specification stage", by adopting elaborate engine tests on a wider scale. It would be preferable to see the fundamental parameters applying to such tests extracted from the performance tests and made the basis of simple laboratory bench tests, preferably in automatic apparatus.

To the extent that an oxidation test is a valuable indication, it is necessary to emphasize the need for a more realistic test of greater precision.

This particular test has been taken as a "chopping block" but there are other tests—such as sulphated ash in relation to metallo-organic additives—which equally require the searchlight of constructive criticism (see Table V).

TABLE V

Approximate Time for Completion of Test

Viscosity, IP 70	15 min to 1 hr
Viscosity, IP 71	35 to 40 min
Viscosity Index, IP 73	1 hr
Water Content, IP 74...	1 to 1¼ hr
Total Acidity (Neutralization Value) IP 1	10 to 15 min
Inorganic Acidity, IP 1	45 min
Acidity/Alkalinity—grease, IP 37 ...	2 to 2½ hr
Pour Point, IP 15	Up to 8 hr according to value
Sulphur Content, IP 63	1 to 1½ hr
Demulsification Number, IP 19	2 to 2½ hr
Saponification Value, IP 136 ...	4 hr
Penetration—worked, IP 50 ...	2 hr
Drop Point, IP 31 or 132	1 to 2 hr
Heat Stability—Timken method ...	49½ hr
Foaming Test, ASTM—D.892 ...	3 hr

It is hoped therefore that this is an interpretation of an outlook already finding expression in collaborative work between the industry, represented by its standardizing body the IP, and apparatus suppliers, to overcome some of the quality control testing problems.

Conclusion

Subconsciously, it is probable that the whole question of quality control is founded on suspicion and mistrust, not only of the supplier by the consumer but also of the failings of the human element and even of the methods involved in the manufacture and testing of lubricants.

To return to the individual consumer, it is possible to divide the community into two classes—those who wish to, or are forced to, purchase goods at the cheapest possible price and those who are convinced that in the long run it pays to purchase an article at a comparatively high price but with the reliability guaranteed by a reputable supplier. The onus of quality control in the latter case is on the supplier who is jealous of his high commercial reputation, but the incentive to perfect methods of quality control and the finance to pursue it are more readily in evidence. This should lead ultimately to removal of much of the conscious or subconscious suspicion.

Acknowledgments

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Around the Branches

BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

London Branch

Geiger counters and lead vests were the order of the day on 3 May, when a party of thirty members of the London Branch visited the Atomic Energy Research Establishment at Harwell.

The party arrived at Harwell in bright sunshine, and in four groups toured various parts of the establishment including "BEPO", the engineering services, the mechanical handling and chemical engineering sections, and the effluent disposal plant.

The size of the BEPO building and the ease of control of the reactor were surprising, and no less interesting were the elaborate precautions taken when handling "hot" materials. These included lead "coffins" which were stored in "cemetery blocks".

An amusing interlude occurred at the mechanical handling section when members tried their skill in manipulating remotely controlled mechanical fingers. The members were shown how, in addition to deftly handling laboratory equipment, the "fingers" could even remove handkerchiefs from pockets at four yards range—such equipment obviously has great possibilities in connexion with weeding for future generations of "deckchair" gardeners.

At the effluent treatment plant, members were impressed by the way in which effluent was treated and rendered harmless before being discharged into the Thames. All active matter is precipitated and after concentration is disposed of in old oil drums which are dropped into the sea.

The party left Harwell after a most interesting and enjoyable day—happy in the thought that even in an atomic age, the petroleum industry will still be needed, if only to supply the second-hand oil drums!

Presentation to Norman Hitchcock

On 3 May the Committee of the London Branch gave a farewell dinner at Verrey's Restaurant, Regent Street, to mark the retirement from the Committee of Norman Hitchcock.

Originally associated as a committee member and a leading light with the London Students' Section of the IP before the war, Norman Hitchcock played a prominent part as a member of the Organizing Committee in the founding of the London Branch when this replaced the Students' Section in 1947. He served the Branch as chairman from 1950–1952 and his untiring work in office and his valuable assistance as an "elder statesman" to subsequent committees have contributed in no small measure to the present successful position of the Branch.

At the close of the evening the chairman, Ron Leach, presented Norman with a handsome silver tankard engraved with the names of the Committee members. The tankard was then subjected by all present to a short series of "performance tests" to ensure that it was suitable for subsequent service!

The Birthday Honours

Included in the honours awarded on the occasion of Her Majesty The Queen's Birthday are the following:—

Knight Bachelor

E. W. Thompson, chairman of John Thompson (Wolverhampton) Ltd, a Member-Company of the IP.

Companion of the Order of the Bath

K. L. Stock, Under-Secretary, Ministry of Power.

Companion of the Order of St Michael and St George

G. G. G. Watson, Q.C., British Petroleum Co. of New Zealand (South West Pacific) Ltd, for services to legal profession.

Commanders of the Order of The British Empire

I. D. Davidson, lately president of the Compania Shell de Venezuela Ltd.

H. M. Jones, lately general manager of the Anglo-Egyptian Oilfields Ltd, Cairo.

C. M. Vignoles, O.B.E., managing director, Shell-Mex and B.P. Ltd.

Photo by Walter Bird

C. M. Vignoles, C.B.E.

Officers of The Order of The British Empire

C. E. H. Druitt, M.C., Assistant Petroleum Attaché at H.M. Embassy in Washington.

W. B. Hesmondhalgh, lately First Secretary (Information), U.K. Delegation to The U.N., New York. (He is now deputy head of The News Division of The Shell Petroleum Co. Ltd, London).

Members of the Order of the British Empire

A. J. Porter, security officer, Esso Petroleum Co. Ltd, Glasgow.

G. M. Davies, manager, Mode Wheel (Trafford Park) Terminal, Manchester, Esso Petroleum Co. Ltd. Past-chairman of IP Northern Branch and former *ex-officio* Member of Council.

Personal Notes

E. J. Dunstan, M.Sc., M.I.Chem.E., (Member of Council), who resigned recently from the position of director and general manager of Manchester Oil Refinery Ltd, has been appointed Industrial Vice-Principal of the Manchester College of Science and Technology.

It is with regret that we announce the death of **Dr N. E. Rambush,** Hon. D.Sc., chairman and managing director of The Power-Gas Corporation. Born in Denmark in 1889, he came to Britain in 1911 and soon became a partner of Arthur H. Lymn, a chemical engineer. In 1918, The Power-Gas Corporation acquired this business, and Dr Rambush became chief engineer of the larger corporation at Stockton-on-Tees.

He studied chemistry and chemical engineering under Professor Hinchley in London and became a founder member of the Institution of Chemical Engineers. His book *Modern Gas Producers* was published in 1923, and has been widely acknowledged ever since.

In 1927, he became technical manager to Power-Gas and the associated Ashmore, Benson, Pease, and Company; in 1931, general manager; in 1933, he was made a director of Ashmore's and in 1938 managing director; vice-chairman in 1947; and the final honour came in 1951 with the chairmanship of The Power-Gas Corporation, which by then had become the parent Company of The Power-Gas Group of companies.

Major W. R. Brown, D.S.O., has been appointed to succeed the late Dr N. E. Rambush as chairman and managing director of The Power-Gas Corporation. Major Brown is well known in the iron and steel industry, at home and abroad, for his work in connexion with the design and construction of modern blast furnaces. Appointed to the Board of Directors in 1942, he was elected vice-chairman last year, and has been associated with the Corporation for 30 years. Outside his company activities, he takes considerable interest in the work of scientific and technical institutions associated with engineering, metallurgy, and the making of iron and steel.

The Hon. Gerald Lascelles, who has recently been associated with Tecalemit Ltd, has joined the Board of Smith and Grace (Sales) Ltd. He will assist in the future development and commercial exploitation of Tecalemit oil-firing equipment.

C. G. Brook, M.Inst.Pet., has resigned his position of general manager, National Benzole Co. Ltd, after 37 years' service with the Company. He has been succeeded by **A. M. Robertson,** who was general manager of Scottish Oils and Shell-Mex Ltd.

A. M. Robertson

C. G. Brook

Mr Brook joined National Benzole in 1920, and became assistant manager of the London Division in that year and manager in 1921. In 1926, he went to Manchester as manager of the Lancashire Division, returning to London in 1928, when he was appointed Group sales manager at Head Office. He was promoted to sales manager in 1937, became an assistant general manager in 1949, and general manager in 1952. During the war years he was appointed deputy sales manager of the Petroleum Board, a position which he held until 1948.

In addition to many public appointments, he was Mayor of Beckenham 1945-6.

C. M. Vignoles, C.B.E., M.Inst.Pet., general manager, Shell-Mex and B.P. Ltd, has been appointed to serve as a member of the Clean Air Council.

N. H. Haworth has retired after more than fifty years' service with Mobil Oil Co. Ltd. When the Industrial Sales Department was formed in 1936, he was appointed marketing assistant, and he has helped to guide the department through its many changes ever since.

N. R. Seddon, who was general manager of the Dominion and Eastern Markets Division of the Distribution Department at BP's London office from the beginning of 1956 until recently, has departed for Australia to join the Boards of The Commonwealth Oil Refineries Ltd, BP's marketing organization in Australia, and of BP Refinery (Kwinana) Ltd. This follows the appointment of **R. B. Dummett,** as announced in these columns in April, to the Board of The British Petroleum Company in London.

Mr Seddon has been with the BP Group for twenty-three years. After joining the (then) Anglo-Persian Oil Company in 1933, he was posted to Baghdad, and subsequently held various posts in Iran and Iraq. In 1951 he was appointed

chief representative in Teheran. He returned to the United Kingdom at the end of 1951 and, until 1 January 1956, was manager, Marketing Division (Eastern Markets).

A. S. Dodd.

A. S. Dodd has been appointed a director of John Thompson Water Tube Boilers Ltd and London Manager of John Thompson Ltd. At the London office he succeeds **C. J. Howard,** who was recently appointed managing director of John Thompson Water Tube Boilers Ltd. Mr Dodd joined John Thompson at Wolverhampton five years ago, having previously served as senior engineer, Merz and McLellan, at Newcastle-on-Tyne.

J. Boyd.

J. Boyd has been appointed area manager of John Thompson Ltd at Belfast, and will represent the John Thompson Group in Northern Ireland and Eire. In the latter territory, he will co-operate with William Peat and Company, of Dublin, who are agents for John Thompson Wilson Boilers Ltd. He will also open a new area office for John Thompson, at 26 Wellington Place, Belfast, where a drawing office for John Thompson Water Tube Boilers Ltd has been in operation for a year.

Mr. Boyd, who has been employed by John Thompson for seven years, was previously assistant manager at the Company's Glasgow office. His last visit to Ireland was in 1950, as a member of the Scottish Junior Football Association team which played against Northern Ireland "B" team at Grosvenor Park.

Sir George H. Nelson, Bart, Hon.LL.D., chairman of The English Electric Group of Companies, was recently installed as this year's President of the Institution of Mechanical Engineers. Already a past-president of the Institution of Electrical Engineers, this new appointment gives further recognition of Sir George's services to the engineering industry and to his work in the field of technical education. He has also served as President of the Federation of British Industries and is a member of the Federation's Grand Council. He is a Governor and an Honorary Fellow of Queen Mary College (University of London) and an Honorary Fellow and a member of the governing body of the Imperial College of Science and Technology.

J. W. Middlemas has been appointed chief engineer of Fina Petroleum Products Ltd. He joined Fina two years ago, and was previously chief engineer to W. W. Chamberlain (Associated Companies) Ltd.

Sir George Briggs, A.M.I.Mech.E., has been appointed a director of General Refractories Ltd, Sheffield. Sir George, who is on the Board of The Brush Group Ltd, Payne Products International Ltd, Thomas Tilling Ltd, and the Royal Ordnance Factories, is also a council member of the British Institute of Management.

IRAQ PETROLEUM BOARD CHANGES

Photo by Bassano Ltd

Sir Stephen Gibson, C.B.E.

Sir Stephen Gibson, C.B.E., a past-president of the IP, has retired from the office of managing director of the Iraq Petroleum Co. Ltd and its Associated Companies, after a period of 7½ years in that capacity.

The Boards of the Iraq, Basrah, and Mosul Petroleum Companies have therefore announced the following appointments:—

G. H. Herridge, an executive director of the Iraq Petroleum group of companies since 1953, has been appointed managing director. Immediately after leaving Cambridge in 1926, he joined the Turkish Petroleum Co. Ltd, which in 1929 became the Iraq Petroleum Co. Ltd. He spent his early years with the Company in Iraq, having joined the Baghdad office before oil in commercial quantities had been discovered. In 1934 he was attached to the office of general manager in the Middle East, with responsibility for the organization of geological exploration parties.

G. H. Herridge

In 1943 he was appointed assistant general manager of the Company's operations in the Middle East; in 1947, general manager in the Middle East; and, in 1951, he went to the Company's headquarters in London.

Photo by Douglas Glass

H. W. Fisher

H. W. Fisher has been appointed an executive director with the title of "joint managing director." He joined the Standard Oil Company (New Jersey) upon graduation from Massachusetts Institute of Technology in 1927. After experience in various branches of the organization, he became, in 1945, a director of Esso Standard Oil Company and President of Enjay Company Inc. In 1951 he was appointed co-ordinator of refining for Jersey Standard's world-wide refinery operations. Since 1954 he has resided in London as Jersey Standard's shareholders representative in the U.K., and chairman of its Co-ordination Committee for Europe.

CBMPE OFFICERS

Captain G. P. Claridge, R.N. (Retd), chief executive of the CBMPE, has recently resigned from that post on account of health reasons, and **G. V. Sims** has been appointed Director of the Council.

G. C. Carr, A.M.I.Mech.E., F.Inst.Pet., has been appointed Technical Adviser in succession to **T. L. Bonstow,** M.I.C.E., M.I.Mech.E., F.Inst.Pet., who will, however, continue with the Council as Consultant.

ESSO BOARD APPOINTMENTS

Esso Petroleum Co. Ltd announces that the following appointments were made on 31 May:—

Hugh C. Tett, A.R.C.S., B.Sc., D.I.C., A.M.I.Mech.E., F.Inst.Pet., a managing director, was appointed chief executive of the Company. In his 29 years with Esso he has held important appointments on both the technical and sales side of the business, including managing director of Esso Research Ltd. He became a director of Esso Petroleum Co. Ltd in 1951 and managing director in 1956.

H. C. Tett

N. P. Biggs

A. W. Wooldridge

Photo by Douglas Glass

N. P. Biggs, who joined the Board in 1952, has been appointed a managing director. He has had 25 years' experience of international banking and investment, and was formerly a director of Kleinwort Sons & Co. Ltd, merchant bankers. From 1927 to 1946 he served with the Bank of England, latterly as assistant to the Chief Cashier (Exchange Control).

A. W. Wooldridge, M.Inst.Pet., who joined the Company in 1923 and has made his career in sales and marketing, having held a number of important positions in the provinces and Head Office, has been appointed to the Board of Directors.

TWO NEW CASTROL DIRECTORS

C. E. R. Millidge and **A. A. Barr** have been appointed to the Board of Directors of C. C. Wakefield & Co. Ltd in conjunction with their present offices of manager, Castrol Division, and Group publicity manager, respectively.

C. E. R. Millidge

Charles Millidge, who is 53, joined Wakefields in March 1918. In 1926, he was appointed representative for the Bucks and Northants area. Throughout world war II he served in the R.A.S.C., attaining the rank of major. Shortly after his return to civilian life with Wakefields, he was recalled to Head Office to become assistant manager of the Motor Department and, two years later, manager. In 1952, he was appointed manager of the Castrol Division.

Angus Barr is 46. He joined Wakefields 29 years ago as a junior in the Publicity Department and, in 1938, became assistant publicity manager under **J. A. V. Watson.** During the war he served with the R.A.F., returning to Castrol Publicity in 1945. Three years later, he became manager of his Department and, in 1955, Group publicity manager. Angus Barr is married and has two daughters.

A. A. Barr

U.K. CONSUMPTION OF PETROLEUM PRODUCTS

Deliveries (excluding bunkers) of petroleum products for inland consumption in the United Kingdom during the period January to March 1957 were 963,891 tons less than those in the same period in 1955, according to figures published by the U.K. Petroleum Industry Advisory Committee.

The decrease is largely attributable to decreases of 418,071 tons in motor spirit (incl. industrial benzole) and of 377,855 tons (excl. refinery consumption) in the gas, diesel, and fuel oil category.

Full details are given in the following table:—

U.K. DELIVERIES INTO INLAND CONSUMPTION OF PETROLEUM PRODUCTS (IN TONS)*

Product	*January to March*	
	1956	1957
Aviation fuels	415,751	403,089
Motor spirit (incl. motor benzole):		
Premier grades	685,133	454,650
Standard grades	720,533	532,945
	1,405,666	987,595
Industrial spirits (incl. industrial benzole)	37,677	41,945
White spirit	36,643	36,563
Kerosine:		
Burning oil	336,760	269,191
Vaporizing oil	128,178	105,712
	464,938	374,903
Derv fuel	420,773	387,368
Gas, diesel, and fuel oils:		
Gas/diesel oil	710,904	525,011
Fuel oil	1,896,474	1,704,512
Refinery consumption ...	549,908	500,572
	3,157,286	2,730,095
Lubricating oils and greases ...	208,636	197,015
Paraffin wax and scale ...	12,726	12,737
Propane and butane	16,605	12,614
Bitumen	191,335	192,763
Other products	161,655	184,113
	6,529,691	5,565,800

* Deliveries for bunkers for ships engaged in the foreign trade are not included.

Notes of the Month

Company Reorganization

Fletcher Miller Limited resolved on 30 May that, for formal purposes of reconstruction, the Company should be wound up voluntarily. William Moss, F.C.A., of Booth Street Chambers, Ashton-under-Lyne, was appointed liquidator. The continuity and policy of the business will remain undisturbed.

New SMBP Depot

Shell-Mex and BP Ltd are building a new depot at Scrabster, on the extreme northern coast of Scotland, to feed the new Dounreay atomic plant and to supply petroleum products to the area of north-eastern Scotland at present served by existing depots at Thurso and Wick.

The depot will receive its main supplies by coastal tankers, and will have ample storage tanks and the most up-to-date dispensing equipment. There will be three road loading gantries and equipment, including a vehicle washing bay and a greasing/repair bay.

Test Drilling in France

The first deep test well drilled by the Société des Pétroles de Valence (in which the BP Group has a 50 per cent interest) is nearing completion at St. Lattier in the Valence Basin, South-East France, at a depth of some 8500 feet. It has yielded valuable information.

A second well is to be drilled at Montmiral, about nine miles to the north-west of St. Lattier.

Oil Prospecting Rights Granted in Bolivia

The Bolivian Government has granted oil prospecting rights over two million hectares (about 5 million acres) in two separate blocks to Shell Prospecting Company Ltd. This follows the granting in January 1957 to the same company of a non-exclusive reconnaissance permit over a large area of the country. The new blocks which are of about 1,500,000 and 500,000 hectares respectively are situated in central Bolivia.

Preparations are already in hand to start aerial survey, surface geological, and geophysical work.

BP's Purchases in U.K.

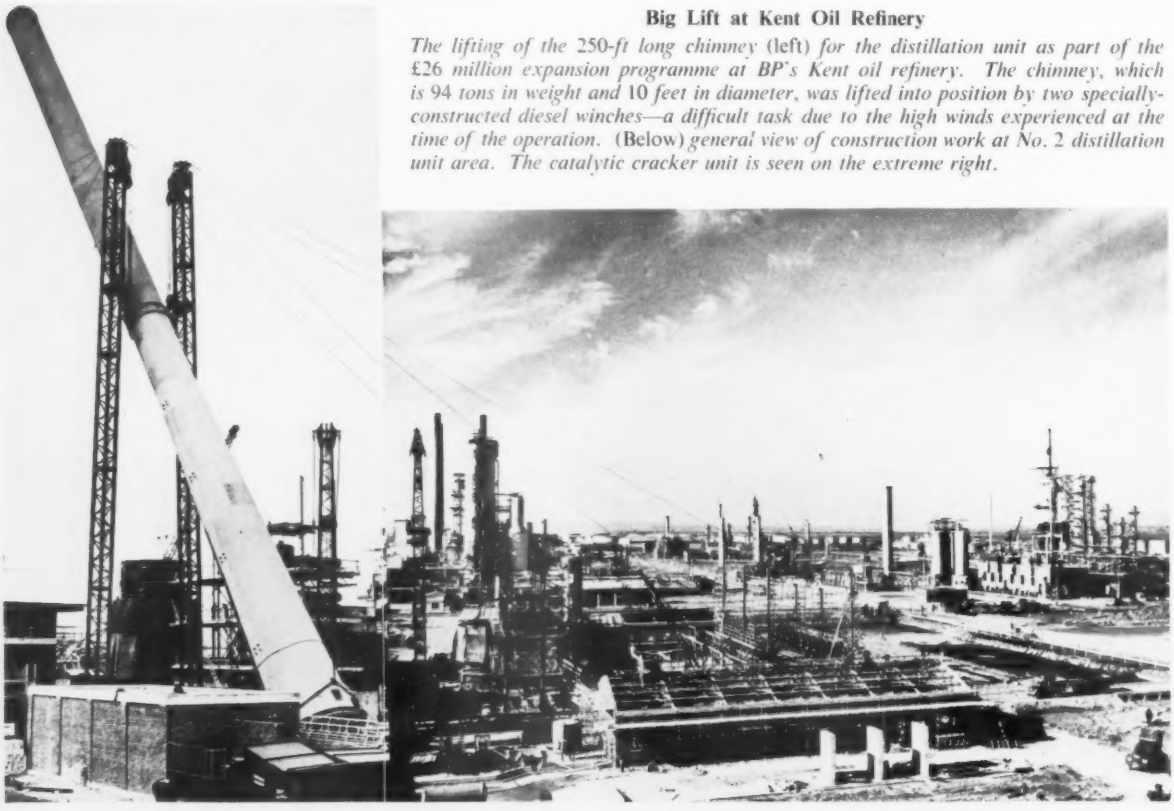
During 1956 BP Trading Limited (BP's principal trading subsidiary) placed orders for materials, equipment, and services to the value of £34 million. Of this total, orders worth £31,500,000 were placed in the United Kingdom.

In addition, refineries and other main subsidiaries of the Company in the United Kingdom placed during the year orders valued at about £3 million to cover their local requirements. Orders valued individually at £500 and above were divided among approximately 600 suppliers in the U.K.

All this expenditure is additional to BP's very large orders for the construction of tankers in the United Kingdom.

Big Lift at Kent Oil Refinery

The lifting of the 250-*ft long chimney* (left) *for the distillation unit as part of the* £26 *million expansion programme at BP's Kent oil refinery. The chimney, which is* 94 *tons in weight and* 10 *feet in diameter, was lifted into position by two specially-constructed diesel winches—a difficult task due to the high winds experienced at the time of the operation.* (Below) *general view of construction work at No.* 2 *distillation unit area. The catalytic cracker unit is seen on the extreme right.*



New Administration Building at Shell Haven A Shell photograph

New Administration Building at Shell Haven Refinery

A new office building costing £300,000, to house all the 300 administrative personnel at Shell Haven refinery, has recently been completed. This additional accommodation has become necessary owing to the construction programmes now under way. These consist of expansion of the oil refining facilities at a cost of over £6½ million and the current development of chemical manufacturing, particularly in the field of nitrogen chemistry, at a cost of a further £6½ million. The existing office buildings, including the refinery manager's office, have been in use since 1920. Designed by Howard V. Lobb and Partners and built by John Laing & Sons Limited, the new premises have been erected at remarkable speed. Piling work for the foundations began in September 1955 and was completed in one month. Meanwhile, casting had begun on the site of the reinforced concrete H-frames which were lifted into position to form the main superstructure. The main building is 295 ft long, 40 ft wide, and consists of three storeys with staircase towers at front and rear. External features include the use of blue-grey vitreous enamel panels, incorporating moisture barrier and heat insulation, and large areas of glass, comprising double glazing units, to give maximum light on all floors.

Eastern Nigerian Oil Well Disappoints

The second well at Akukwa in Eastern Nigeria has been completed at a depth of 11,992 feet. Results of this test well drilled by Shell–B.P. Petroleum Development Company of Nigeria have been disappointing. No oil or gas was encountered in the formation around 8000 feet deep, which caused the spectacular blowout two years ago in the first Akukwa well only 600 yards to the North-East. It therefore seems probable that only a minor, though high-pressure, gas socket was struck in the first test.

Between 8000 feet and the final depth of the second well, small gas indications were obtained, which still remain to be tested, but the Ideal 100 drilling rig, which drilled the test well, will now be moved from the location and replaced in about one month's time by an Ideal 50 test rig. Until these tests have been completed and the results studied, no decision can be taken by the Company on the possibility of drilling additional wells on the Akukwa structure.

The Ideal 100 drilling rig is being moved to Elele, in Adwada Division, some 30 miles north of Port Harcourt, to drill an exploration well there. Drilling is expected to commence at the beginning of June.

British-Designed Plastics Plant for Poland

The order for the design of a large-scale polystyrene plant in Poland has been awarded to Petrocarbon Developments Ltd. The process employed is that originally engineered by Petrocarbon for Styrene Products Ltd, an associate of Shell Chemical Company Ltd, and for an installation in France owned by the Pechiney group. The new plant will incorporate the latest operating experiences of Styrene Products Ltd.

The value of services and equipment supplied from the U.K. will be approximately £350,000; a substantial portion of the equipment will be manufactured locally.

Ten More Scholarships for Nigerians

Ten new technical scholarships to Loughborough College, Leicestershire, are to be awarded by Shell–B.P. Petroleum Development Company of Nigeria.

Valid for a period of four years, the scholarships include four in electrical engineering, and three each in mechanical engineering and automobile engineering.

They will be open to any Nigerian, provided that he already holds the required educational qualifications.

In addition, I. Anyanwu, an employee in the Petroleum Engineering Department, is shortly to be sent to the U.K. for a preparatory year at the Sir John Cass College in London and thereafter he will be entered in a British University to study petroleum technology.

Grangemouth Refinery Expansion

The annual processing capacity of BP's Grangemouth refinery is to be raised from 2,200,000 tons to 3,100,000 tons at a cost of some £4 million.

To effect this increase, an existing crude oil distillation unit is to be replaced by a larger plant of this type. Ancillary refining units are also to be added, as well as extra tankage and other facilities.

The refinery's increased processing capacity of 3,100,000 tons will approximately equal the annual carrying capacity of the 57-mile crude oil pipeline from the Finnart tanker

terminal on Loch Long to Grangemouth. At Finnart a new jetty, capable of taking the largest tankers, is to be built.

The expansion at Grangemouth is due to be completed in 1959 and that at Finnart towards the end of 1958.

The Cost of Advertising

"I can only speak for a petrol company but I know that the amount spent on advertising petroleum products is such a small fraction of the selling price that its total elimination would not affect it to any worthwhile degree." This was said by C. M. Vignoles, C.B.E., managing director of Shell-Mex and B.P. Ltd, when addressing the recent 24th Annual Conference of the Advertising Association. The title of his address was "The civic responsibilities of the advertiser". He said that in the field of competitive selling there was every justification for advertising. Both petrol and motor oil had considerably improved since competition was restored and this had paved the way for the design and production of more efficient motor cars.

Equipment for Nuclear Power Stations

Sir Josiah Eccles, who, as deputy chairman (operations) of the Central Electricity Authority will be responsible for the commissioning and operation of England's first commercial nuclear power stations, recently saw the progress being made on the manufacture of parts for the Authority's Berkeley (Gloucestershire) nuclear station, which is being built by the A.E.I.—John Thompson Nuclear Energy Co. Ltd.

He was visiting the Wolverhampton works of John Thompson Ltd, and the massive 3-inch thick steel dome, which forms the bottom of one of the 1000-ton reactor vessels, was almost completely fitted together on a huge "jig" before transportation in sections to the power station site, where it will be welded together. When completed, the reactor vessel will be 50 ft in diameter and 80 ft high.

Also now in active production at this Wolverhampton works are some of the big heat-exchanger units which will contain 150 miles of pipework and tubes to convert the heat from the reactor into steam. One of the intricate fuel-loading machines is also taking shape and much of the steel thermal shielding which will surround the reactor vessels is complete in sections ready for welding preparation.

Seen in front of the massive dome which, when inverted, will form the bottom of the 1000-*ton reactor vessel for the Berkeley Nuclear Power Station are* (l to r) *E. W. Thompson (now Sir E. W. Thompson), chairman, John Thompson Ltd, Sir Josiah Eccles (deputy chairman, C.E.A.), H. West (managing director, A.E.I.—John Thompson Nuclear Energy Co. Ltd), and J. H. N. Thompson (deputy chairman, John Thompson Ltd.)*

Coryton's Catalytic Reformer Commissioned

The catalytic reforming unit at Mobil's Coryton refinery is now in operation. This new unit is designed to produce high-octane petrol and was completed last Autumn. However, it was left standing idle because of the Suez crisis and the resulting uncertainty of crude supplies which led to the rationing of products.

Constructed by Bechtel International Ltd, the unit is designed to process 6000 barrels per day of low-octane naphtha. It consists essentially of a pretreater for the removal of sulphur followed by three reactors in series containing a platinum catalyst.

British Computer Society

Some months ago a working party was formed to examine a proposal to establish a national society which would meet the needs of those interested in computers and automatic data-handling techniques. Agreement has now been reached and it has been decided to form a new body, to be called the British Computer Society.

The London Computer Group, which was formed in 1956 and which has so far catered primarily for business interests, with a current membership of 500, has agreed to take part in the formation of the new Society and to add its resources to it; all existing members of the Group will automatically become members of the new Society.

Further information may be obtained from the Hon. Secretary, The British Computer Society, 29 Bury Street, London, S.W.1.

Trophy for *The Shell Magazine*

For the second time in three years, the Industrial Editors' Trophy for the best British house journal of the year has been won by *The Shell Magazine* whose present editor is K. B. Showler. Last year, this award was won by *Shell–*

BP News, the staff magazine of Shell-Mex and B.P. Limited.

The trophy was presented to *The Shell Magazine* at the annual convention of the British Association of Industrial Editors at Harrogate on 11 May.

The Shell Magazine has been published regularly since 1921 for employees of the Royal Dutch/Shell Group of Companies throughout the world. Its present circulation is over 71,000. Over 50,000 copies are despatched to overseas subscribers, and the magazine is believed to have the largest international circulation of any house journal in the world.

New Oil Well Planned for Western Nigeria

A new deep test oil well in the western region of Nigeria is to be drilled in the near future by Shell–B.P. Petroleum Development Company of Nigeria, some 16 miles south of Benin City which lies about midway between Lagos and Port Harcourt.

The site of the new test well is off the Benin–Sapele road in the vicinity of the Ossiomo River and the move to drill there will mark a further speeding up of exploration activities in the western region of the country.

The last well drilled in the area was in 1954, at a site north-west of Benin City. A small non-commercial oil-show was encountered at a depth of 6387 ft at which point the well was abandoned.

At the Ossiomo location preparations on the site by engineers and transportation officials are now in progress and the well is scheduled to be "spudded-in" in the second half of this year. An Ideal 100 drilling outfit, capable of reaching much greater depths (of over two miles) than that used at the first well, will be used.

Japan's Deep Test Well

Spudded in on the "First Day of Spring" on a site about 10 km from Nagoaka, this well is being drilled by the Teikoku Oil Company. It will be the first deep test in Japan as it is intended to wildcat below 13,000 feet. Present Japanese wells have a maximum depth of less than 6000 feet. Rig is a National Type 110 and its four-section drive group has Superior PTD–6 engines and Gyrol fluid drives.

Japan's first deep drilling rig at the time of the "spudding in" ceremony

New Tanker for SMBP

Launched recently from the Northwich yard of W. J. Harwood & Sons Ltd, the *Shell Glassmaker* is the eighth vessel of the programme of nine estuarial craft ordered by Shell-Mex and B.P. Ltd, and the sixth of seven vessels of her class included in this order.

Like her sister ships, the *Shell Glassmaker* has been specially designed to carry maximum petroleum cargoes on rivers of comparatively shallow depth, with strong tides, acute bends, and low arches. When completed, she will go into service in South-West England and work between Swansea, Newport (Mon), Worcester, Gloucester, and Bridgwater.

The ship, built to comply with Lloyd's requirements for petroleum vessels, has the following dimensions:—

Length o.a.	139 ft
Breadth moulded	21 ft 6 in
Depth moulded	12 ft
Draught loaded	10 ft 6 in
Deadweight	460 tons

In common with the remainder of the nine vessels, the *Shell Glassmaker* will be fitted with Voith Schneider propulsion, and her stern form has been specially designed for this purpose.

Main propulsion machinery consists of a Lister-Blackstone EVSM 6 Marine diesel engine four-stroke, rated at 360 bhp at 600 rev/min, fresh water cooled, driving through a modern wheel drive oil-operated clutch.

Auxiliaries consist of No. 1 set, comprising a Lister type 2-cyl, 4-stroke diesel driving a Lancashire Dynamo and Crypto 10-kW, 110-volt generator, one Hamworthy compressor, and a Lancashire Dynamo and Crypto 2-kW, 24/30-volt lighting generator.

No. 2 set comprises a Lister Type 2 JPMA, 2-cyl, 4-stroke diesel driving a Lancashire Dynamo and Crypto 10-kW 110-volt generator and Hyland pump to operate

the windlass. There is also one Lancashire Dynamo and Crypto 2-kW, 24/30-volt lighting generator.

Cargo pumps are two Stothert and Pitt size 210 screw displacement pumps, each of 125/140 tons per hour capacity, arranged to drive through Vee belts and dry plate clutches from a forward extension of the main engine.

British Oil Burner Manufacturers' Association Ltd

The principal guest at the Annual Luncheon of the British Oil Burner Manufacturers Association was C. M. Vignoles, C.B.E., managing director of Shell-Mex and B.P. Ltd, who replied to the toast of "The Guests" proposed by J. R. C. Boyce, president of the Association.

Many representatives from the oil industry among the guests included D. A. C. Dewdney (Esso Petroleum Co. Ltd), J. R. V. Cooper (Fina Petroleum Products Ltd), Lester N. Horne (Charringtons), and R. C. Clegg (Stevinson, Hardy, and Co. Ltd).

At the General Meeting before the Luncheon, J. R. C. Boyce was elected president for a fourth term, together with J. D. Fitzgerald (Combustions Ltd) and W. A. Hubbard (Hubbard Combustion Ltd) as the two vice-presidents. R. G. Sutton (Urquhart's (1926) Ltd) was again elected honorary secretary.

Other members of the Council are:—

Commander W. F. R. Gough (J. Samuel White & Co. Ltd).
P. A. Martin (May Oil Burner (England) Ltd).
W. C. J. Mollison (Todd Oil Burners Ltd).
H. F. C. Newsom (Nu-Way Heating Plants Ltd).
F. C. Pillinger (G. C. Pillinger & Co. Ltd).
A. M. Wood (The Wallsend Slipway & Engineering Co. Ltd).

Launch of *British Courage*

British Courage, another 32,000-dw ton tanker for the fleet of the BP Tanker Company, was launched, on 13 May, by Mrs. Dunkley, wife of G. W. Dunkley, an executive director of the Iraq Petroleum Co Ltd.

Built at the Hebburn-on-Tyne yard of Hawthorn, Leslie (Shipbuilders) Ltd, this tanker is the second 32,000-tonner to be launched for the Company this year. The Company now have seven tankers of this size in service, and, in addition to *British Courage*, another six 32,000-tonners are building, of which two—*British Valour* and *British Glory*—have already been launched and are due to be brought into service towards the middle of this year.

New Office Buildings for Pernis Oil Refinery

On 21 May, Reconstruction Day in Rotterdam, the Corporation of Rotterdam presented a mosaic to the management of Pernis refinery to mark the final stages of the occupation of new office buildings.

Begun 2½ years ago, the new offices will at first house a staff of 700, but may eventually be used by 1100 employees. The total number of employees at the refinery is now 5000.

The building is 375 feet long, 51 feet wide, and 165 feet high at its tallest point. From the main entrance a fine staircase divides the premises into a long and short wing. The short northern wing is assigned to executive staff, while the long wing is occupied by technologists. On the seventh floor is a dining-room with seating for 450 people. From the partially sheltered roof terrace a unique view over the entire refinery, the largest in Europe with a current capacity of 15 million tons per annum, can be obtained. On a clear day it is possible to see far into the Botlek region, the new

A Shell photograph

The new office buildings at Pernis Oil Refinery

industrial area which stretches west from Rotterdam to the North Sea.

In building the new offices, extensive use was made of plastic based on polyvinylchloride, a chemical manufactured at Pernis. All cold water pipes, sewage pipes, piping for electric circuits, floor covering, electric light fittings, ventilators, etc., were made from plastics. Paints based on "Epikote", another Shell product, were extensively used.

I.E.A. Exhibition

The late 1950s are often referred to as "The Electronics Age", for the development of electronics has led to the production of a wide range of instruments which are employed in nearly every major industry, the medical profession, and for research purposes. Some of these instruments can count at a rate of 30,000 units a second, measure with an accuracy of 1/100,000th of an inch, and detect an escape of gas which is leaking at the rate of 1/50th of an ounce a year.

A display of such instruments was seen recently on the two hundred stands at the Instruments, Electronics, and Automation Exhibition, held at Olympia, London. A central feature of the Exhibition was a section devoted to "Electronics at Work and Play", the aim being to demonstrate in a non-technical manner equipment of the different kinds which are essential in the Age of Electronics.

For example, the elusive golden ball, which is electronically whisked away when one reaches out to grasp it, is associated with the problems of fitting safety guards to fast-moving machinery.

Exhibits of particular interest to the petroleum industry included batch analysis apparatus; continuous flow absorptiometers; Karl Fischer titration apparatus; liquid flow monitors; titration absorptiometers; pneumatically operated diaphragm motor valves for automatic process control; a mobile instrumentation and automatic control testing unit; laboratory glassware; a complete range of electronic instrumentation and control equipment for the measurement and control of flow, pressure, temperature, specific gravity, and level; a smoke alarm; electronic computers; mass spectrometers; vapour phase chromatographs; positive displacement meters and auxiliary equipment; miniature indicators and recorders; research equipment; a portable oil-testing set for testing insulating oil samples to BS Specifications; fuel efficiency instruments; the Fisher Type 430 blending unit for automatically controlling blending processes; titromatic analysers; remote control systems; and an automatic Reid vapour pressure recorder.

Member companies who had stands at the Exhibition were as follows:—

Baird & Tatlock (London) Ltd
J. Blakeborough & Sons Ltd
Costain—John Brown Ltd (Instrument Division)
H. J. Elliott Ltd
Eversheds & Vignoles Ltd
Honeywell-Brown Ltd
George Kent Ltd
Lancashire Dynamo Electronic Products Ltd
Metropolitan-Vickers Electrical Co. Ltd
Stemco Ltd
Taylor-Short & Mason Ltd
J. W. Towers & Co. Ltd

Among the exhibits on the DSIR stand were the following instruments (1) a device for measuring the air content of an oil sample very rapidly, and (2) a portable immersion viscometer for determining the viscosity of an oil *in situ*.

A display of current literature was exhibited by the Society of Instrument Technology.

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OIL AND THE SUEZ CRISIS

The Rt Hon Lord Godber, chairman of The "Shell" Transport and Trading Co Ltd, referring to the Suez crisis in his annual statement covering 1956, said that failure to get adequate oil supplies into consuming countries would have resulted in serious economic consequences.

With a full appreciation of its responsibilities, the industry collaborated to avoid such consequences. In Europe, the industry co-ordinating body was the OEEC Petroleum Industry Emergency Group (OPEG), which acted in an advisory capacity to the OEEC Oil Committee. OPEG worked in close contact with the U.S.A. Middle East Emergency Committee, which was advising the U.S. Government. The achievements of these missions was materially better than could have reasonably been forecast early in the emergency, and Lord Godber said that he wished to acknowledge the support and encouragement given by the OEEC Oil Committee and the responsible departments of the U.S. Administration.

Dealing with the extent of the task and the contribution towards its achievement, he said that the emergency happened on the brink of winter. It did not result in a shortage of crude oil production in the Middle East, but of shipping. An average tanker journey from the Persian Gulf to North-Western Europe would take 45 days for the round voyage via the Suez Canal, but 71 days round the Cape of Good Hope. The time factor for a ship normally lifting oil from an Eastern Mediterranean port, but having instead to go to the Persian Gulf via the Cape, would be increased at least three times. While Europe's requirements of oil normally carried via the Canal or from Mediterranean ports was 1,850,000 barrels per day, the same tanker tonnage could only carry round the Cape about half this quantity.

The means of mitigating this deficiency were to substitute Western Hemisphere oil, and to use tankers to the best advantage. The Committees in the early days expected that the best programme they could achieve was to supply Western Europe with 75 per cent of normal requirements for the first quarter of 1957. It is a matter for satisfaction and congratulation that the countries concerned received 85 per cent instead of 75 per cent. A spectacular contribution towards this was the increase of production in Venezuela, and principally by Compania Shell de Venezuela.

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BURMAH OIL COMPANY IN 1956

In his annual statement, Sir Kenneth Harper, chairman of The Burmah Oil Company Ltd, said that in India no new prospecting was undertaken there during 1956. By a resolution on industrial policy announced early in the year, private enterprise can prospect for petroleum only by means of a rupee company in which the Government had a majority shareholding and the controlling voice. The Board was unable to recommend further expenditure on prospecting so long as such conditions persisted.

Burma

The Company's operations in Burma are through its 55 per cent holding in The Burma Oil Company (1954) Ltd. The Union Government holds one-third of the equity in this Company and is helpful and co-operative in the spirit of partnership.

During 1956 good progress was made with the geophysical survey of the Irrawaddy Delta. The terms and conditions governing exploration have been under discussion, and discussions on taxation are also taking place.

Pakistan

Pakistan Petroleum Ltd has received every assistance from the Pakistan Government and continued a vigorous exploration programme in East and West Pakistan. A second well at Sylhet repeated the previous indications of a gas field. A test well for oil will be started at Lalmai this year.

In West Pakistan one test well is drilling and another found poor quality gas in considerable quantity but of no commercial value. Testing continues.

India

Assam Oil Company's oilfield consists of the three contiguous areas, the original discovery area near Nahorkatiya, the Nahorkatiya extension, and Hugrijan, and a fourth area, Moran, about 25 miles to the south-west. All are now proved and the production target has been raised from 1 million to 2½ million tons a year. Discussions are continuing on the formation of a rupee company.

Training Kuwaitis as Rig Men

A new method of training rig men for the Kuwait Oil Company is being developed. At present, about 75 per cent of these employees are locally-recruited Bedouin from the desert, and it will enable them to take over specialized jobs on the rigs in a much shorter time than has hitherto been possible. It will also give the future rig man a better basic training, thus enabling him to earn promotion more rapidly and to progress farther in the company's service.

Dismantling and assembling a small reciprocal pump in the workshop where much of the training takes place.

The new method of training is a development of courses which have, for the last 5½ years, been carried out at the company's Training Centre at Magwa, where Kuwaitis are taught the technical skills that will enable them gradually to play a larger part in the development of their country's oil resources. In this way, it is hoped to replace the skilled artisans who at present have to be brought in from other countries to fill specialized jobs.

Until recently, rig men had to learn their trade on the job, which was not only difficult for them, but also took longer. About three months ago, however, it was decided to start a course in rig training at the Training Centre. A rig was skidded to the school, a 200-ft hole was bored and cased, and around it the atmosphere of a working rig was, as far as possible, created.

This is probably the first time that such methods have been used. The trainees, who cannot read or write their own language, have been taught to read figures in English, the names of tools (in English), and the identification of rig

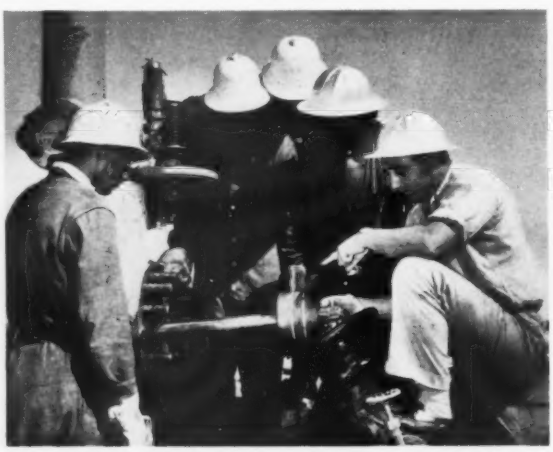
First lessons on the rig.

equipment. They have learned how to cut, thread, and bend pipe, and how to fit unions. Rope splicing and work with wire lines and blocks are part of the curriculum. The men have also been taught how to dismantle and assemble an ordinary reciprocating slush pump. All these qualifications are essential for a rig man.

In the past, the new employee who joined the company straight from the desert, where his occupation had probably been herding sheep and goats, had to learn his job by watching others and by casual instruction. On a busy rig, neither the driller nor the derrick man has much time to give to instructing the "boll weevil", so the advantages to be reaped by this preliminary training at Magwa need no emphasis. To Kuwait Oil Company, which always needs good rig men, it means that the employee becomes more efficient on the job in a much shorter period of time. But both the man and the company will reap a greater benefit; for the rig man who has been trained at the centre will be able to progress much more rapidly beyond the stage of just a useful man around the rig.

Kuwait Oil Company photographs

The trainee rigman being instructed in maintenance of the slush pump.



Books and Films

Light Fractions

This publication by The Shell Petroleum Company might have as its sub-title "Thirty-five years of petroleum humour", for its contents are culled from the volumes of *The Shell Magazine* and its predecessor *The Pipe Line*, which first appeared in 1921. Throughout, these magazines have had a high reputation for their style of presentation and for the quality of their material. In the early days, when the magazine was mainly a "company" organ, the then editor, the late F. J. Whitmarsh, made merry with a page headed "Residue". Fun was poked at members of the staff, who all took it in good part.

In 1938 the character of the magazine changed and it became international rather than parochial both in content and in circulation. A need for a new style of humour arose and "Residue" became "Light Fractions".

Now, under that title also, a selection of the humour of the past thirty-five years has been collected into one book of nearly one hundred pages. A worthy publication, issued at only 2s 6d, and providing much light entertainment.

New Testing Procedure on Absorbers and Heat Exchangers

Two new testing procedures, published by the American Institute of Chemical Engineers recently, deal respectively with absorbers and heat exchangers.

The first covers standard procedures for accumulating data on the degree of absorption, pressure drop, loading, flooding, and on the performance of commercial absorbers, packing, and other vapour–liquid-containing devices.

The heat exchanger procedure, in addition to outlining methods for performance tests of shell-and-tube-type condensers, could be used to compare predictions from theoretical heat transfer and pressure drop equations with commercial performance; to compare results of theoretical pressure drop calculations with commercial performance, to accumulate data on fouling resistance; to provide information to assist the design engineer to make the necessary test connexions for complete performance; and to provide standard directions for conduction performance tests of shell-and-tube-type condensers for comparison with manufacturers' predicted performance.

Shell Bitumen Review

The purpose of this new publication by the Shell Petroleum Company Limited is to present information regarding the properties and uses of bitumen to engineers and others concerned with such work as road construction, coast protection, canal lining, etc. It will also, from time to time, contain articles on industrial and other applications of bitumen. The first number includes an article on Bituminous Base Courses, by J. Greutert, and also an account of full-scale trials on canal bank protection which were carried out on the Suez Canal in 1954.

It is proposed to publish at least one further issue during 1957 and it is the intention that from 1958 the review shall appear quarterly. In the United Kingdom copies are obtainable on application to Shell-Mex and B.P. Ltd, Shell-Mex House, Strand, London, W.C.2, and in other countries from the local office of the Shell Company.

Canadian Oil

The "1957 Survey of Oils" just published by *The Financial Post* (Canada) is the most comprehensive review of the Canadian oil industry. Its 244 pages are packed with details of some 600 companies engaged in oil exploration, production, transportation, and refining. In addition it gives extensive statistics of production and reserves, imports and exports, refineries, and price ranges of Canadian oil and gas stocks. Maps of the most important oilfields, including newly-developed fields, are also given.

Reviewing the general oil situation in Canada, it is stated that the oil and gas industry in Canada has entered a phase of growth that will be the biggest yet. Its potential oil and gas lands are the centre of large exploration and development programmes and some $500 million will be spent on these programmes this year. During the next 25 years the annual rate of spending is expected to increase to $650 million.

The value of such a guide as this needs no emphasis. It can be obtained from Maclean-Hunter Ltd, Wellington House, 125 Strand, London, W.C.2 (price 23s), or from 1242 Peel Street, Montreal 2, or 481 University Avenue, Toronto 2, Canada (price $3).

Shell Employees' Film Show

Films on the oil industry and related topics were seen by 5000 employees of the Shell Petroleum Company at a recent showing at the Dominion Cinema, London.

The films were *Shell—1956*, *Look at Your World* (*No. 5*), and *Song of the Clouds*.

Shell—1956 is a colour filmstrip covering the trading results of the Royal Dutch/Shell group of companies for the year and illustrating some of its most important activities.

Look at Your World is the latest issue in the series of Shell film magazines intended for employees throughout the world. This issue summarizes the history and development of Shell's enterprises during the last half century.

The Voice of Burma

This film, made by The Burma Oil Company (1954) Ltd, mainly for distribution in Burma, was shown to an appreciative audience in London recently by courtesy of the Burmah Oil Company Ltd. In colour, it is based on the journey of Hussein, the carrier, as he travels with his lorry, taking mixed loads of merchandise. Consequently, there are some really magnificent shots of typical Burmese country and its many shrines erected to Buddha.

Throughout there are references to petroleum and indications of what the petroleum industry means to the country and its people. The audience is reminded that it brings light and heat for the benefit of mankind and that from its wax product are made the candles so much used in religious festivals in the East. There are a few shots taken in the Chauk oilfield and in the refinery.

BP Films at Melbourne Festival

Since its inception in 1952, at least one BP film has been shown each year at the Melbourne Film Festival. This year, two of the company's films were shown: (1) *Animal, Vegetable, and Mineral*, and (2) *Distant Neighbours*.

The former is a cartoon which traces the history and development of lubricants from the time of the Egyptians to the present day. The latter is dedicated to the smaller aircraft whose service links the people of remote communities with the rest of the world.

BP Progress in 1956

In his chairman's statement covering the year 1956, N. A. Gass, C.B.E., M.C., chairman of The British Petroleum Co. Ltd, noted that capital expenditure was approximately £86 million, compared with £43 million in 1955. The expenditure under main headings was:

	1956	1955
Refineries	£22,000,000	£ 8,000,000
Tankers	£12,750,000	£ 5,000,000
Marketing interests ...	£29,500,000	£20,000,000
Exploration and production	£21,750,000	£10,000,000

Production

The following table shows the BP Group percentage holding in various crude oil producing companies and the total production of each:

	BP Group	*Total Crude Oil Production*	
	Share-holding	1956	1955
	Per cent	*Tons*	*Tons*
Kuwait			
Kuwait Oil Co. Ltd ...	50	54,117,000	53,894,000
Iran			
Iraanse Aardolic Exploratie en Productie Mij N.V. (through Iranian Oil Participants Ltd) ...	40	25,934,000	15,772,000
Iraq			
Iraq Petroleum Co. Ltd ...	23¾	21,086,000	24,202,000
Basrah Petroleum Co. Ltd	23¾	8,439,000	7,232,000
Mosul Petroleum Co. Ltd	23¾	1,078,000	1,282,000
Qatar			
Qatar Petroleum Co. Ltd	23¾	5,784,000	5,362,000
Trinidad			
Trinidad Petroleum Development Co. Ltd (as from November 1956) ...	77	600,000	500,000
Trinidad Northern Areas Ltd	33⅓	76,000	58,500
Egypt			
The Anglo-Egyptian Oilfields Ltd	31	1,180,000 (10 months only)	1,472,000
United Kingdom			
BP Exploration Co. Ltd ...	100	66,000	54,000
Scottish Oils Ltd (shale oil)	100	77,600	96,600
Canada			
Triad Oil Co. Ltd ...	42	77,000	73,000

Refining

Total refinery throughput in 1956 was 35·5 million tons, an increase of 3 million tons over 1955, and would have been 2 million tons greater but for the Suez crisis.

Major expansion schemes at Kent and Kuwait are making excellent progress and a new distillation unit at Lavera will raise throughput from 2·2 to nearly 4 million tons per annum.

In the U.K., crude oil processed at Kent, Llandarcy, and Grangemouth was 400,000 tons higher at 8–9 million tons. Lubricating oil output at Kent and Llandarcy totalled 200,000 tons compared with 166,000 tons in 1955.

In Europe, the six BP refineries produced 9·5 million tons, 500,000 tons more than in 1955. A new refinery in Germany with initial capacity of 4 million tons is to be built by 1960.

At Aden, refinery throughput increased to 4,615,000 tons against 4,271,000 tons in 1955, and Kuwait throughput was maintained at maximum capacity of 1·5 million tons. Kuwait distillation capacity is to be increased to 8·5 million tons by 1958. The 4 million tons of crude oil processed at Abadan was a substantial increase over the 1955 figure of 2·6 million tons.

The first full year at Kwinana, Australia, gave a throughput of 2,304,000 tons compared with 1,690,000 tons in 1955.

In the Republic of Ireland, BP is to participate with other companies in constructing a refinery at Cork, and in Turkey is to participate in constructing a 3-million ton per annum refinery. In Canada a refinery is being built at Montreal with an initial capacity of 1 million tons.

Tankers

BP Tanker Company had 143 ships at the end of the year, totalling 2,016,000 dw tons. It also had 3 million dw tons on charter. Of the building programme referred to a year previously, 40 ships were due for completion during the next three years. New orders included several tankers of 65,000 dw tons.

To provide facilities for the largest tankers now contemplated, BP are developing a scheme at Angle Bay in Milford Haven and are improving the existing facilities at Finnart.

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Iranian Oil in 1956

Iran received over £54,300,000 in oil revenues for last year from the operations being carried out in the southern part of the country under the terms of the 1954 Oil Agreement.

This fact is included in a report for 1956 by the Iranian Oil Exploration & Producing Company and the Iranian Oil Refining Company, which were formed by the Consortium to operate the oil installations in southern Iran.

The report states that the search for new oil reserves in the 100,000 square miles of the agreement area was resumed in 1956. Work was begun near Bandar Lingeh by a geological party and near Ganaweh, north of Bushire, by two seismic parties. Both areas are coastal ones flanking the Persian Gulf.

Five rigs were in action during the year, three on development drilling and two on exploratory drilling.

One of the exploratory wells, No. 30 at Agha Jari being drilled to determine the limits of the Agha Jari field, recently entered Asmari limestone at 6400 feet and tests showed it to

be a potential producer in the neighbourhood of 20,000 barrels a day. Consequently, a substantial north-western extension of the field has been proved.

Crude oil production amounted to 25,934,000 tons compared with 15,772,000 tons in 1955, and in the particular yearly period specified in the agreement (29 January 1956 to 28 January 1957) was 9·7 per cent in excess of the guaranteed quantities. The production came from six established fields of which Agha Jari (371,000 barrels a day) was the biggest producer. Plans were made to increase its output to 600,000 barrels a day and to develop Gach Saran, so far producing only a small portion of its potential.

The expansion of loading facilities at Bandar Mashur, the crude oil export point, included work on two new jetties which are expected to be commissioned this year. No major pipeline was constructed in 1956.

Refining

Oil delivered to Abadan refinery for processing amounted to 11,227,000 tons compared with 7,266,000 tons in 1955, the increase in intake being made possible by the progress of the overhaul programme begun in 1954. Operations were directed to providing a maximum yield of middle distillates and aviation gasoline.

Deliveries of Agha Jari gas were started to the refinery to replace oil used for fuelling purposes and by the end of the year gas consumption was averaging 39 million cubic feet a day, equivalent to 8000 barrels of fuel oil.

Staff and Labour

At the end of 1956 the operating companies were employing 45,924 men in Iran, of whom 453 were from overseas. During the year, further progress was made in providing them with Company houses. In the fields, for example, 330 houses and flats were constructed, while at Abadan 684 houses have been completed in the last two years and a further 300 were under construction last December.

Training schemes included one for supervisors, which 900 men attended, and one for teaching new skills to redeployed labour. Thirty-five Iranian employees went on training assignments abroad. The Abadan Institute of Technology was formed to provide a four-year course in general engineering. A big programme for the construction of schools in Khuzistan was begun.

Additional recreational facilities were being built, including new swimming pools in the fields areas. New clubs for workers were in the project stage, while the completion of a 2000-seat stadium at Abadan was scheduled for 1957.

Symposia, Conventions, and Exhibitions

1957 Gas Dynamics Symposium

The theme of this symposium, to be held from 26 to 28 August at the Technological Institute of Northwestern University in Evanston, Illinois, will be "Transport Properties in Gases at High Temperatures and Pressure". Details are available on application to Dr Ali Bulent Cambel, Gas Dynamics Laboratory, Northwestern University, Evanston, Illinois.

Production Exhibition

The third biennial Production Exhibition, which deals with methods of increasing productivity in industry, will be held in the Grand Hall, Olympia, London, from 12–21 May 1958.

The Rt Hon the Earl of Halsbury, F.R.I.C., F.Inst.P., M.I.Prod.E., the incoming President of the Institution of Production Engineers, will be President of the Exhibition.

This event acts as a clearing house for ideas in every kind of industrial activity, such as: research and development; training and careers; improved machinery and methods of production; electronics in production; services and aids; nuclear energy; metals and alloys; industrial finishing; distribution.

Those who have taken part in the two previous exhibitions report considerable increase in their industrial contacts.

Further details may be obtained from: The Production Exhibition, 32 Millbank, London, S.W.1 (Tate Gallery 8134).

Piacenza Exhibition and Convention

Delegations from some twenty countries are expected to attend the second International Hydrocarbon Exhibition and the sixth National Methane Show which will be held on 12–22 September in connexion with the Annual Convention on liquid and gaseous hydrocarbons on 12–14 September.

Materials and equipment connected with exploration, transportation, and utilization of liquid and gaseous hydrocarbons will be displayed at the Exhibition.

Further information may be obtained from Ente Manifestazioni Fieristiche Piacentine, Piacenza, Piazza Cavalli n. 35.

British Plastics Exhibition

The International Plastics Exhibition and Convention to be held at Olympia, London, 10–20 July promises to be of considerable interest. It is all-embracing in its scope and the exhibits will cover materials, plant and equipment, and finished products and components.

The Convention will be in nine sessions and will deal with the following topics:—

Polyolefins	10.30 a.m., 11 July
Polythene	2.30 p.m., 11 July
Polyvinylchloride	10.20 a.m., and 2.30 p.m., 12 July
Extrusion	2.30 p.m., 15 July
Injection Moulding	10.30 a.m., and 2.30 p.m., 16 July
Material Developments	10.30 a.m., 17 July
Glass Reinforced Plastics	2.30 p.m., 17 July

Tickets for the Exhibition and for the Convention are available from *British Plastics*, Dorset House, Stamford Street, London, S.E.1.

Second World Metallurgical Congress

This Congress, sponsored by the American Society for Metals, will be held in Chicago, Illinois, from 2 to 8 November. Twenty internationally manned panels will discuss subjects of current concern to the metal working industry. These include steelmaking and refining, non-ferrous refining and fabrication, metal fabrication, heat treatment, welding and joining, inspection and testing, education and research, and metallurgical aspects of atomic energy.

A detailed synopsis is available from World Metallurgical Congress, 7301 Euclid Avenue, Cleveland 3, Ohio, U.S.A.

World Oil Industry in 1956

BP Statistical Survey

The annual statistical survey prepared by The British Petroleum Company has recently been issued and is a useful compilation of charts and tables covering the world petroleum situation during 1956. The commentary is summarized as follows:—

Reserves

Published proved oil reserves showed a record increase over the figures for the previous year. The main upward revision was in the Middle East. Soviet reserves are also estimated to have increased considerably. The Eastern Hemisphere is now estimated to have 76 per cent of the total world oil reserves. Details by countries are shown in Table I. The ratio of the reserves at the end of 1956 to production during that year was 36.

TABLE I

World "Published Proved" Oil Reserves as at End 1956 and 1955

(million tons)

Western Hemisphere	*End*	
	1956	1955
U.S.A.		
Crude oil	4,040	3,980
Natural gas liquids	680	630
Total	4,720	4,610
CARIBBEAN		
Venezuela ...	1,860	1,685
Colombia ...	90	80
Trinidad ...	40	40
Total	1,990	1,805
CANADA	410	370
MEXICO	350	260
ARGENTINA	60	60
PERU	35	30
OTHERS	20	20
TOTAL ... W. HEMISPHERE ...	7,585	7,155

Eastern Hemisphere	*End*	
	1956	1955
MIDDLE EAST		
Bahrain	30	30
Iran	4,025	3,600
Iraq	2,900	2,650
Kuwait	6,750	5,400
Qatar	195	195
Neutral Zone ...	90	70
Saudi Arabia ...	5,275	4,870
Egypt	35	20
Total ...	19,300	16,835
WESTERN EUROPE	195	190
EAST INDIES ...	745	380
U.S.S.R., ETC. ...	3,350	1,470
OTHERS	70	25
TOTAL ... E. HEMISPHERE...	23,660	18,900

TOTAL WORLD END 1956 31,245
TOTAL WORLD END 1955 26,055
SOURCE: U.S.A. ... American Petroleum Institute.
Canada ... Canadian Petroleum Association.
Others ... *Oil and Gas Journal.*

Production

Total crude oil production of 857·1 million tons in 1956 was 9 per cent over the 1955 total of 789·3 million tons. Up to October the rate of growth had been about 11 per cent but was then retarded by the Suez crisis. Middle East production was only 7 per cent over 1955 compared with a post-war average of 19 per cent annually. Caribbean and U.S. production were stimulated by reduced Middle East oil and gained 13 per cent and 6 per cent respectively.

Consumption

Total world oil consumption in 1956, equivalent to 851 million tons of crude, was 8·5 per cent higher and in line with the average increase since the war. Of this total, 62 per cent was consumed in the Western Hemisphere, 27 per cent in the Eastern, and 11 per cent in the U.S.S.R., etc.

Supply and Demand

Net imports of petroleum by the U.S.A. were 51 million tons, compared with 46 million in 1955, although after the Suez crisis there was a decline in the quantity of Middle East oil imported.

During the last two months of 1956 many tankers were diverted from the long Persian Gulf–Europe haul to the shorter voyage from the Western Hemisphere. There was in consequence a substantial increase from 16 million tons in 1955 to 22 million tons in 1956 in the net movement of Western Hemisphere oil to Europe.

Refining

At the end of 1956 world refining capacity totalled 904·7 million tons per year, an increase of about 9 per cent. Of this total, 591·7 million tons was in the Western Hemisphere and 313 million tons in the Eastern.

Variations in refinery yields are shown as set out in Table II.

TABLE II

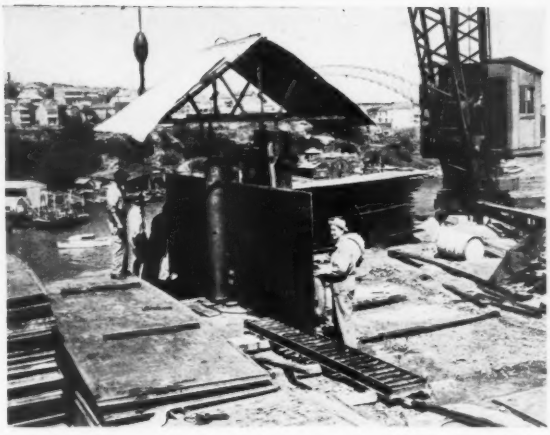
Refinery Yields

(Percentage by Weight)

	U.S.A.	*Other West*	*Western Europe*	*Other East*
Gasolines	38	20	20	20
Kerosines	4	6	4	9
Gas and diesel oils ...	23	2	23	19
Fuel oil	14	50	36	41
Lubricants	2		3	
Refinery fuel and loss ...	4	22	8	11
Others	15		6	

Tanker Fleet

The world tanker fleet in 1956 showed a net increase of 3·4 million dw tons to reach a total of 41 million dw tons. Of this total, 17·7 million were owned by oil companies and 26·7 million by others. Tanker requirements were consistently high throughout the year and laid-up tonnage was at very low levels. At the end of 1956, 29·8 million dw tons of tankers were under construction or on order, of which 15·8 million were for vessels of 30,000–45,000 dw tons, and 5·3 million tons for ships of over 45,000 dw tons.



BP photographs

The heavy steel plates (right) *stacked on the cliff top, were used in the construction of the new* 12,000-*ton storage tank.* (Left) *Welding the base plates of one of the new storage tanks. The brick-faced retaining wall was built to form a bund for safety purposes, to contain the fuel in the area in the event of any mishap.*

New Tanks at Berry's Bay, Sydney

To meet the ever increasing demand for liquid fuels, two new storage tanks have been constructed by The British Petroleum Company's Australian marketing associate, Commonwealth Oil Refineries Ltd, at their Berry's Bay installation, Sydney. One tank, for motor spirit, has a capacity of 12,000 tons and the other, for diesel oil, has a capacity of 5000 tons.

Special factors had to be considered in planning the work. First, the excavation site was close to existing white products storage tanks. Secondly, many homes built directly on to sandstone readily transmitted vibrations. Thirdly, small craft moored in the bay below the site were vulnerable to flying rock. Finally, the height of the tank tops had to be restricted to preserve the harbour view of nearby residents.

Before installation, some 17,000 cubic yards of rock were removed, but the only unusual features of the project were safety precautions taken to prevent possible fires and to minimize shock waves set up in the parent rock. In overcoming shock waves the Company drew on the experience gained by the N.S.W. Government Railways in driving the tunnels for Sydney's underground railway system.

Preparation of holes for blasting rock was by means of conventional pneumatic drills but the firing of the shots was done electrically, using millisecond delay detonators, ensuring that charges were exploded in a predetermined sequence, spaced at intervals of one-thousandth of a second.

This had the result of preventing the individual explosions setting up one large shock reaction, since by proper timing one charge largely damped out the shock of a previous one. Furthermore, the obvious advantage of firing a number of holes simultaneously and bringing down a large quantity of rock was maintained.

Checks were kept on the effect of explosions by the use of a vibrograph. In all cases, the vibrations caused were well below the level beyond which experience elsewhere indicated damage to buildings could be expected.

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MIDDLE EAST PRODUCTION

	Tons	
	April	*Jan.–April*
Iraq Petroleum Co. Ltd ...	934,392	1,718,131
Basrah Petroleum Co. Ltd ...	670,489	2,774,252
Mosul Petroleum Co. Ltd ...	34,283	58,731
Qatar Petroleum Co. Ltd ...	410,733	1,846,716
Iraanse Aardolie Exploratie en Productie Mij	2,675,000	10,678,000

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for April was 1,413,000 tons, the total for 1957 being 5,559,000 tons.

The production of the Kuwait Oil Co. Ltd during the first three months of 1957 totalled 11,080,657 tons.

U.K. PETROLEUM EQUIPMENT EXPORTS

Details of the preliminary returns for 1956 exports from the U.K. of certain petroleum equipment are set out below in comparison with the final figures for 1955:

	1956 *cwt*	1955 *cwt*	1956 £	1955 £
Oil well drilling machinery ...	68,783	71,992	2,434,414	2,150,198
Mineral oil refining machinery	85,837	109,045	2,106,918	1,716,547
Oil fuel burning equipment ...	31,695	26,157	1,036,124	863,507
Domestic stores and grates for liquid fuels:				
(of iron or steel)	93,552	79,924	1,995,396	1,535,240
(of non-ferrous metals) ...	11,041	12,760	281,210	352,043

Petroleum in Parliament

Somaliland Oil Leases

On 8 May, the Under-Secretary of State for the Colonies said that Conoco Somal Ltd and Standard Vacuum Oil Company had indicated their willingness to pay compensation to Somaliland farmers and others whose livelihoods may be adversely affected by their companies' operations.

Nigerian Oil Production

On 8 May, the Under-Secretary of State for the Colonies said that plans for commercial production could not be prepared until the results are known of production tests which the oil companies hope to begin in the latter half of this year. It was also not yet possible to say whether any oil produced could be used locally.

Continuing, he said that it was not the present intention that any of the Nigerian Governments should actually participate in any exploitation that takes place but they would of course benefit by way of royalties and taxation.

Cyprus Oil Prospecting Licence

In a written reply on 8 May, the Under-Secretary of State for the Colonies said that the Cyprus Government had granted a licence to the Forest Oil Corpn, Pennsylvania, which covered the major part of the Colony and its territorial waters. No other company had recently shown interest of this kind in Cyprus, he said, and he welcomed all efforts by well-intentioned firms to develop the resources of the island.

Natural Gas

In a written reply on 20 May, the Paymaster-General said that natural gas had been found in relatively small amounts in Yorkshire and other parts of the country during the past few years but not in sufficient quantity for commercial exploitation. A recent show at Trumfleet, Yorkshire, required further investigation before the quantity available could be determined. The search is continuing.

Suez Canal

On 20 May, the Minister of State for Foreign Affairs said that H.M. Government certainly supported the view that the Egyptian Government should be required to conform to the six principles of the Security Council agreed last October. It would continue its efforts to this end.

Fuel Oil Emergency Surcharge

On 20 May, the Paymaster-General said that as the oil companies had taken off the remainder of the emergency surcharge, the Minister of Power had decided that it was now no longer necessary to ask them to consult him before making changes in prices.

In reply to supplementary questions he said that since the onset of the Suez crisis, the price of oil had risen 2½d a gallon as a result of increases in Gulf prices. The U.K., he said, had no control over Gulf prices, which must continue to be reflected in the price to the consumer.

His impression was that the higher elements in the price of petrol since before Suez were the increase in the basic price at the Gulf of about 2½d a gallon and the increased cost of 1d a gallon in the retailers' margin, agreed between the oil companies and the retailers, which are not a responsibility of the Government.

Oil Pipeline Project

On 21 May, the Parliamentary Secretary to the Ministry of Power said that there were 17 oil companies concerned in a pipeline project from the Persian Gulf to the Mediterranean via Turkey, and it is for the companies themselves to decide their plan first and then to make any representation which they consider necessary to the Governments concerned, including the United Kingdom Government. He also said he hoped that British skill and materials would be most fully used when these plans were put into operation.

Exploration in Malta

In a written reply on 29 May, the Under-Secretary of State for the Colonies said that he was informed by the Maltese Government, within whose competence the matter falls, that the B.P. Exploration Co. Ltd had been exploring for oil in Malta under an oil exploration licence granted in July 1954, which had since expired. The company applied for an oil prospecting licence but no agreement had been reached. He said that he was also informed by the Maltese Government that other companies were interested but he had no details.

MIDDLE EAST OIL

When the Suez Canal situation was debated in the House of Commons on 15–16 May, the Prime Minister made particular reference to the problem of oil. There would be an increasing world-wide demand for oil in the years to come and facilities for bringing oil from the Middle East must be enlarged. The international Suez Canal Company had plans for increasing the capacity of the Canal. What would now happen was not known and consideration must be given mainly to additional pipelines and expanded tanker fleets.

The international oil companies were studying pipelines but, as far as tankers were concerned, the existing fleets would soon be insufficient to cater for all world requirements. Reviewing the tanker situation, Mr Macmillan said that by 1965 the number of super-tankers of over 40,000 dw tons in service would probably be 300, perhaps a quarter of the whole world's tanker tonnage.

There was the question of where these tankers could discharge and adequate facilities for ships of up to 80,000 or even 100,000 tons must be planned. The British oil companies were preparing to handle the increasing number of super-tankers and Milford Haven looked like being a major European oil port.

The plans for pipelines and for tankers required large steel supplies and the steel industry also had to be expanded. Plans were well under way and by 1962 output would represent an increase of no less than 60 per cent, said the Prime Minister.

Middle East Oil Adviser

These plans required the close co-operation of numerous Government Departments and of private companies. Therefore, he had decided to appoint Sir Matthew Slattery as a special adviser on the transport of Middle East oil and to assist in concerting and directing the activities of the various Government agencies.

Sir Matthew had been a conspicuous success as chairman and managing director of Short Brothers and Harland Ltd and would take up his duties at once.

New Oil Refinery for Turkey

A group of oil companies, composed of Mobil Overseas Oil Company Inc., The British Petroleum Company, California Texas Corpn, and the Royal Dutch/Shell Group, has been requested by the Turkish Government to construct a new 3,250,000 tons a year refinery in Turkey.

The initial installations will include a crude petroleum distillation unit and a catalytic reforming unit for upgrading naphtha. These units will be designed to process Middle East and Turkish crude, and will produce automotive gasoline, kerosine, diesel fuel oil, and heavy fuel to meet the requirements of the Turkish market.

The refinery will include, in addition to processing units, loading and unloading facilities, wharves, docks, tanks, transfer lines, electrical distribution systems, telephone systems, radio facilities, water and drainage systems, office buildings, warehouses, maintenance shops, roads, and railways.

It is estimated that the cost of the new refinery, excluding the cost of land, will be equivalent to $48 million (approximately £17m) which will be provided by the four companies. Of this total, it is estimated that the equivalent of $13·5 million (approximately £4m) will be spent in Turkey. The exact location of the refinery will be determined before the end of June 1957.

The four participating companies will form a jointly owned refinery company incorporated under the laws of the Republic of Turkey. Mobil Overseas will have a 37 per cent interest, Caltex 34 per cent, Shell 18 per cent, and British Petroleum 11 per cent in the refinery.

This new refinery, together with an existing refinery at Batman in south-eastern Turkey, which is owned and operated by the Turkish Government, will be sufficient to meet all Turkey's needs for petroleum products. It will process imported crude oil until production of domestic crude oil substantially increases, when it will refine Turkish crude.

The right to operate the refinery will be for a period of 80 years with a right of renewal.

Trade Literature, etc.

Change of Name

"Shell" Refining and Marketing Co. Ltd announce that the name of the Company has been changed to Shell Refining Co. Ltd.

Solvent Decarbonizing

This 16-page "Kellogram" describes the process developed to supplement vacuum distillation and to recover a substantially higher percentage of profitable catalytic feed from residues which could otherwise go to fuel or to thermal cracking.

The booklet, which contains 20 diagrams and photographs, is obtainable from: Advertising Dept., The M.W. Kellogg Company, 711 Third Avenue, New York 17, N.Y.

MAPEL'S Cathodic Protection System

Metal and Pipeline Endurance Ltd announces that the Company recently received its fifty-fourth order for the cathodic protection of the ballast compartments of tankers. Details of the system are available on application to the Company at Artillery Mansions, Victoria Street, London, S.W.1.

Mobil Hydraulic Brake Fluid

This Automotive Engineering Memorandum includes a useful summary of SAE specifications for hydraulic brake fluids. It also outlines the essential characteristics of Mobil hydraulic brake fluid, which has been designed to more than satisfy the SAE 70R1 heavy-duty specification.

Copies of the memorandum are available on application to Mobil Oil Company Ltd, Caxton House, Tothill Street, Westminster, London, S.W.1.

Distilled Water

The Permutit Company have introduced a new portable plant for the production, without use of heat or steam, of distilled water. Known as the Mark V Portable "Deminrolit", it supplies up to 6 gallons of pure water per hour, and is particularly suitable for laboratory and small process work.

The Company's address is Permutit House, Gunnersbury Avenue, London, W.4.

Rotary High Vacuum Pumps

Details of a wide range of "Speedivac" rotary high-vacuum pumps, for use by chemists, physicists, and electronic workers, are contained in the latest catalogue issued by Edwards High Vacuum Ltd, Manor Royal, Crawley, Sussex.

Ether's Expansion Programme

A new factory, with an area of 60,000 sq. ft, is now under construction for Ether Ltd, who announce that the Company is about to market an entirely new range of solenoid valves. It will be recalled that in 1956 the Company introduced the Transitrol Series 900 indicating temperature controller and, more recently, the Transitrol Type 994 programme temperature controller.

Details of these instruments are available on application to Ether Ltd, Tyburn Road, Erdington, Birmingham 24.

Cathodic Protection for Tankers

F. A. Hughes & Co. Ltd have received instructions for the protection of the cargo/ballast compartments of the 32,000-dw ton *British Sailor* of the B.P. Tanker Co. Ltd. The company reports that this is the 350th order for the "Guardion" three-stage system of cathodic protection, which is already in use in 275 ocean-going tankers.

"Thermagrid" Tubular Distillation Trays

This leaflet explains how heat in Thermagrids can be added or removed, as required, at tray level and in the tray itself. This is claimed to be clearly a step forward from the coil/bubble cap tray form of construction, or the heat exchanger/pump method frequently used for absorption plant designed for isothermal or near isothermal operating conditions.

Copies of the leaflet are obtainable from Metal Propellers Ltd, 74 Purley Way, Croydon, Surrey.

Selas Control Valves

Selas Gas and Engineering Co. Ltd has recently issued, in loose-leaf form, pages 273-80 of its catalogue. This gives comprehensive details of the Company's adjustable port oil-air proportioning and flow control valves for manual or automatic operation. It is

claimed that these valves constitute a flexible, mechanical, and trouble-proof method of proportioning and controlling the flows of oil and air in double pipeline burner systems. All adjustments for oil-air ratios are external and, once the port areas are finally adjusted, they remain permanently set.

The Company's address is Selas Works, City Road, Manchester 15.

Breast Battery Lighting Set

A new type of portable lighting set, developed by the G.E.C. in collaboration with a large oil company, has recently been certified by the Ministry of Labour and National Service as intrinsically safe for use in inflammable atmospheres.

The lamp is prefocused and is switched on and off by a rotation of the front cover. It can be worn in any position on the webbing body harness or alternatively on the elastic head harness.

The lighting set is powered by three standard 1·5-volt unit cells and the total weight including batteries is just under 3½ lb.

Further details are obtainable from The General Electric Co. Ltd, Magnet House, Kingsway, London, W.C.2.

Raising the Tug *Hammal*

The Kuwait Oil Company's 460-ton tug *Hammal*, which sank on 26 August 1956 in 70 ft of water, one and a half miles offshore from Kuwait, has recently been refloated in a series of ten separate lifts after its fuel and water tanks had been refilled with compressed air.

Twelve 6-ton chain lifts were employed and wire hawsers were secured to two 600-ton barges (which acted as pontoons) by massive clamps locked by studs. These were tightened at each low tide with Consolidated Pneumatic type 375 impact wrenches, and as the tide rose, the two barges lifted the tug from the sea bed.

Air Purification

The problem of atmospheric pollution by noxious fumes from industrial processes has been dealt with in the U.S.A. by catalytic combustion, a low-temperature oxidation process by which the fumes are converted to odour-free gases. This plant will be made and marketed in the U.K. by the Chemical Engineering Division of W. C. Holmes & Co. Ltd, and is to be known as the Holmes-Catco Process.

The plant is compact, running costs are stated to be low, and the heat in the oxidized gases can be utilized. The plant requires a minimum of attention and the usual life of a catalyst element before re-activation is necessary is 1½ to 3 years continuous running. Re-activation is carried out at a very small cost. Details are available from the Company, P.O. Box B7, Turnbridge, Huddersfield.

Selection and Application of Subsurface Pumps

In this Bulletin, the first section, the basic operation of subsurface pumps, which are of the reciprocating type, is outlined. Section II is devoted to API pump classifications, and the three following sections to subsurface pumps selection, applications, and operating conditions. In the remaining sections notes are given on inspection, transport, installation (in the well), and storage.

The Bulletin (No. M6-956) extends to 36 pages and includes a number of informative illustrations. Copies are obtainable from Oil Well Supply Co. Ltd, 5 Queen Street, London, E.C.4.

Level Control Equipment

An enlarged range of electronic units and a selection of proximity switches for level control of oils and other non-conductive or water-free liquids is now being manufactured by Elcontrol Ltd, 10 Wyndham Place, London, W.1.

Products for the Tanning Industry

Mobil Oil Co. Ltd have just issued a useful booklet on the subject of leather and furskin oils and greases under the above title. Various products which the Company market for this purpose are listed and a recommendation chart is given.

SITUATIONS VACANT

Readers may reply to IP Review *Box Numbers in the fullest confidence by following this procedure: Place the stamped envelope addressed to the advertiser in another envelope addressed to the Advertisement Manager of the* IP Review, *together with a note of names to which the reply should not be sent.*

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An International Engineering Group of Companies in the Chemical Engineering Industry require a first-class man for liaison with clients and design groups on large-scale projects.

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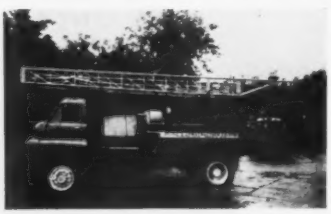
Foamite Crash Tenders

Since the prototype of the new Foamite Crash Tender was shown at the Farnborough Air Display in 1956, several improvements have been made, including lowering of two driving lamps to a beneath-the-chassis position to give a greater field of illumination, and the addition of stone guards for them. The two auxiliary headlamps in the raised position for run-way illumination are retained, as well as an underslung fog lamp and a hand-controlled spotlight mounted on top of the cab. They are now in continuous production by the parent company, Tecalemit Limited, at Plymouth.

New British Rig

Piling and Construction Co. Ltd report encouraging orders for their Pilcon "650" rotary drilling rig, which has a rated capacity for shot holes or water wells of 650 ft of 4⅞-inch hole. Rotary table has four forward speeds (52-335 rev/min) and one reverse, and the double-drum drawworks has a rated single-line pull of 4000 lb on each drum. Controls are grouped in a panel at the drillers' position and the outfit is designed for mounting on a 4-5 ton truck. Details are available from the Company's Drilling Equipment Department, 111 St. James' Road, Croydon, Surrey.



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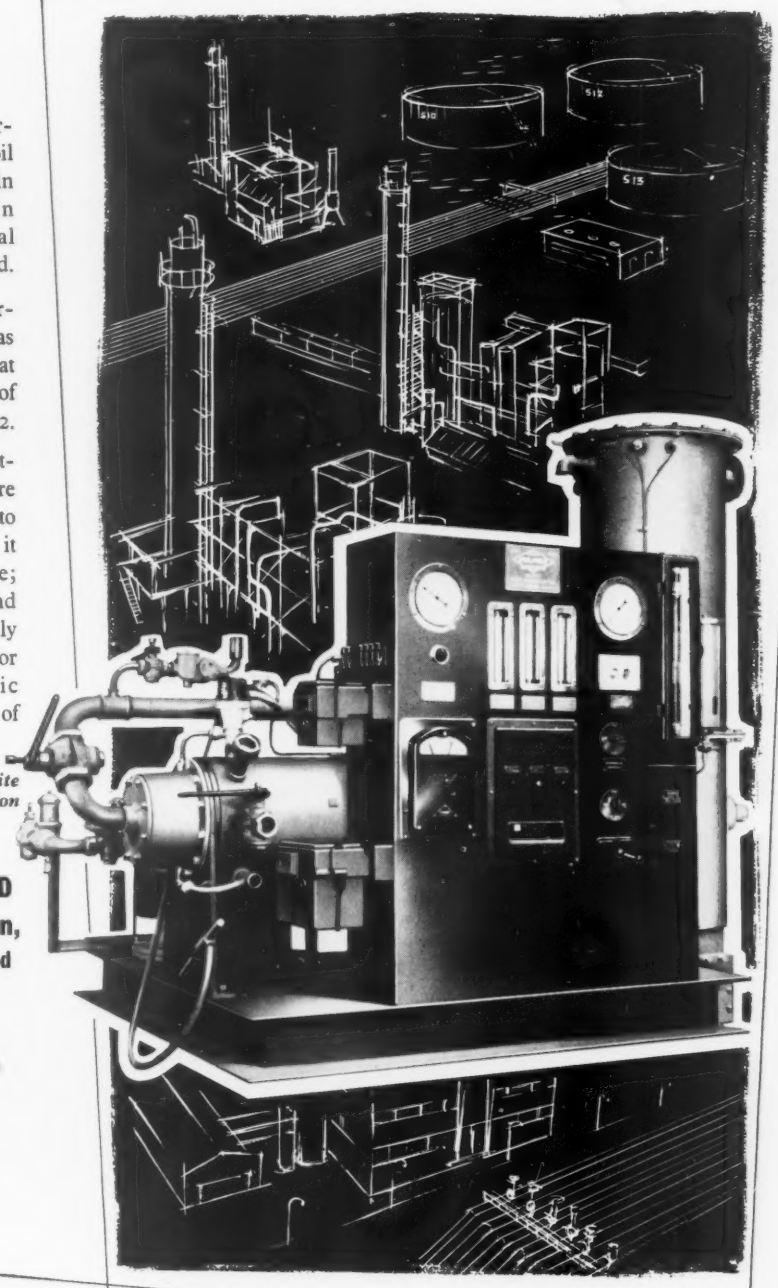

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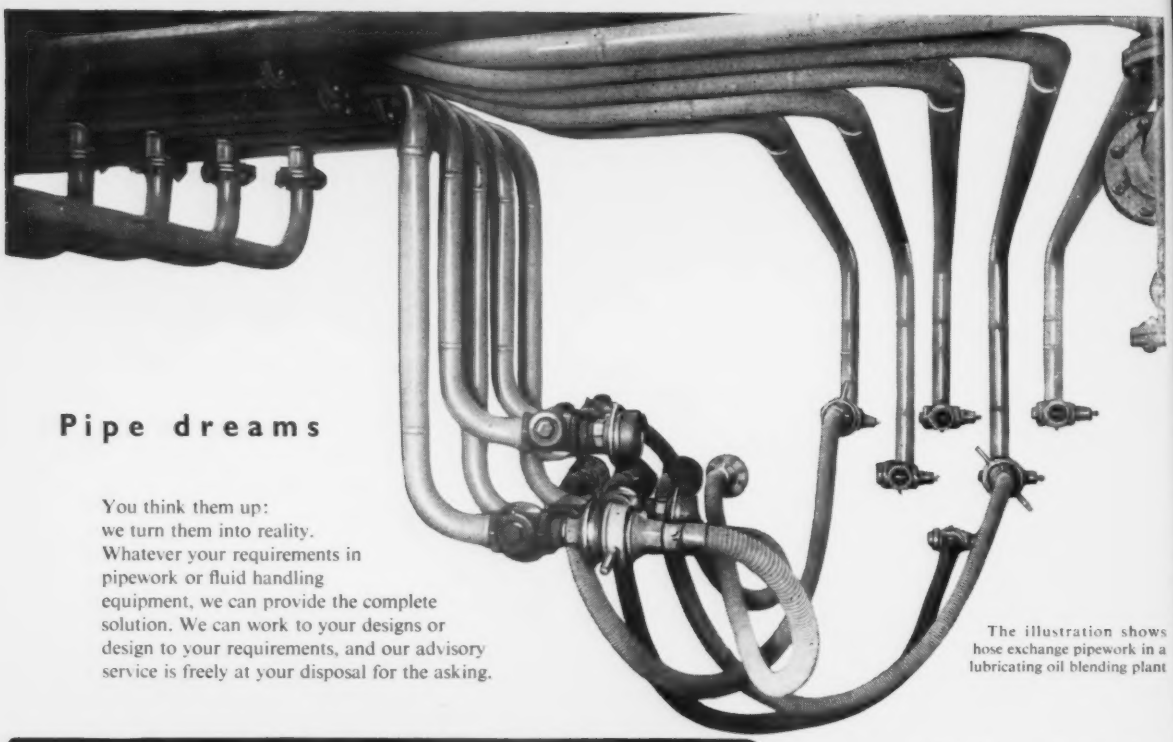

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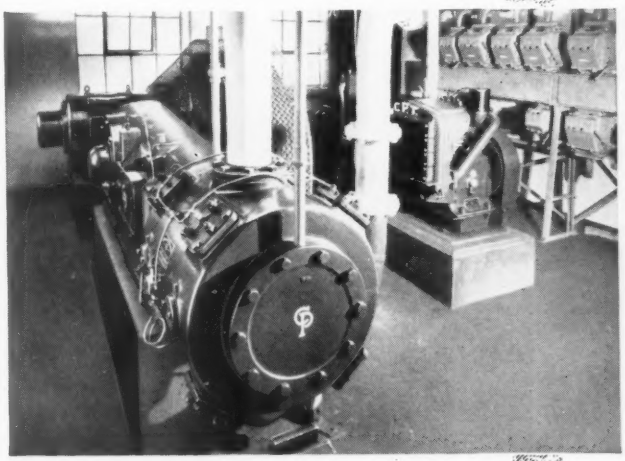

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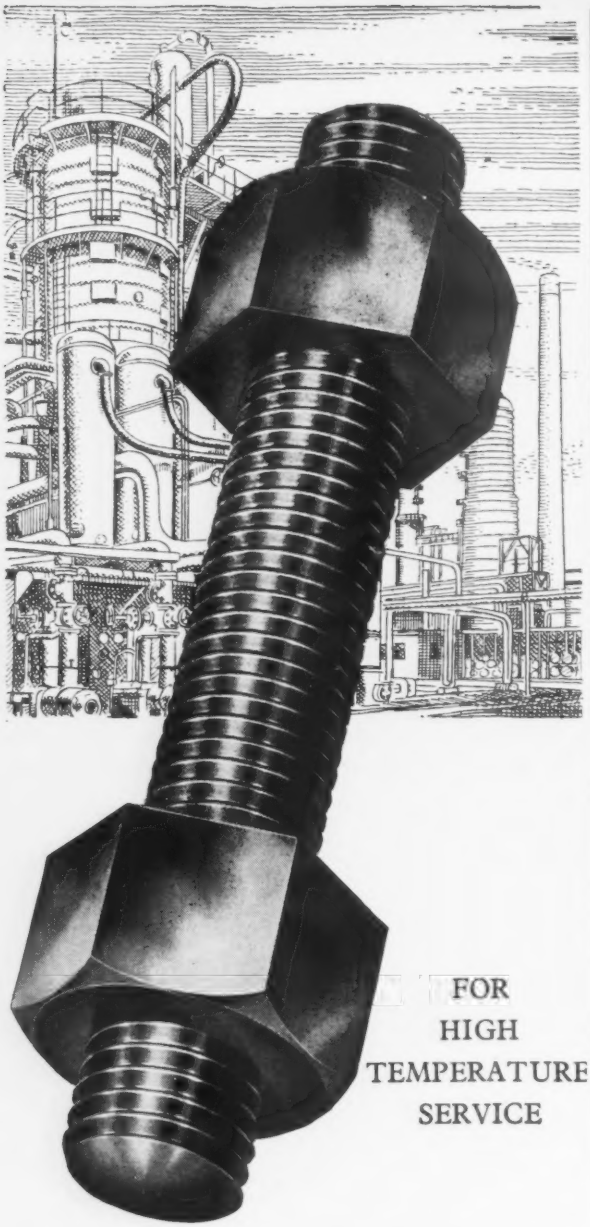

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Fischer & Porter Ltd	June
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Fothergill & Harvey Ltd (Tyglas)	Mar.
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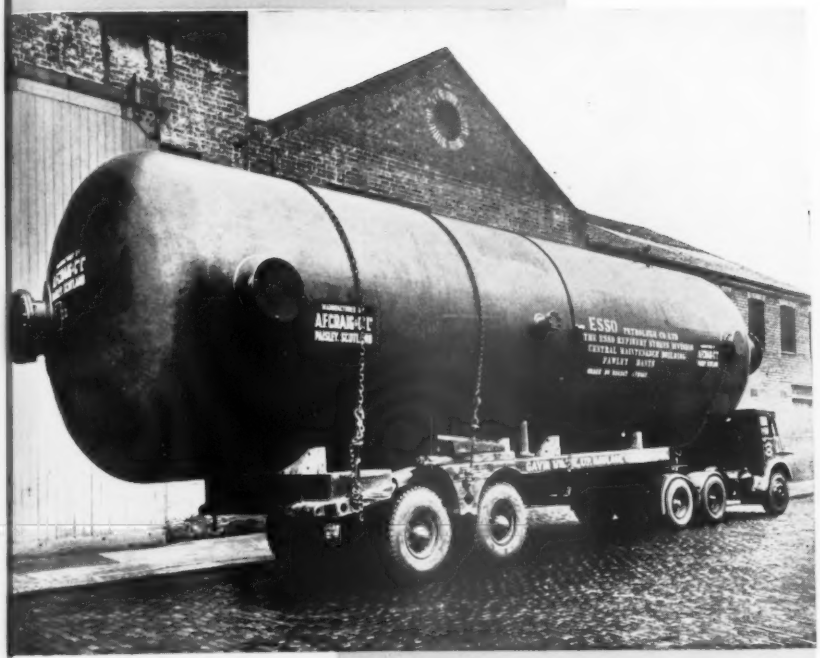
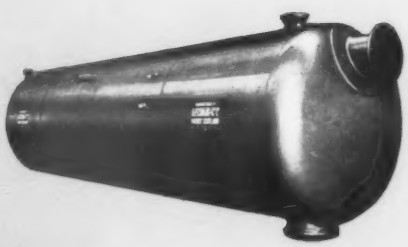


Illustration (left), shows a mild steel Disengaging Drum 12 ft. internal dia. by 40 ft. long overall, leaving the makers' works in Paisley for Esso Petroleum Co.'s Refinery at Fawley.

The dead weight of the drum is 23 tons.

It was designed and constructed in accordance with the API-ASME Code for Unfired Pressure Vessels. The welded seams were completely radiographed.



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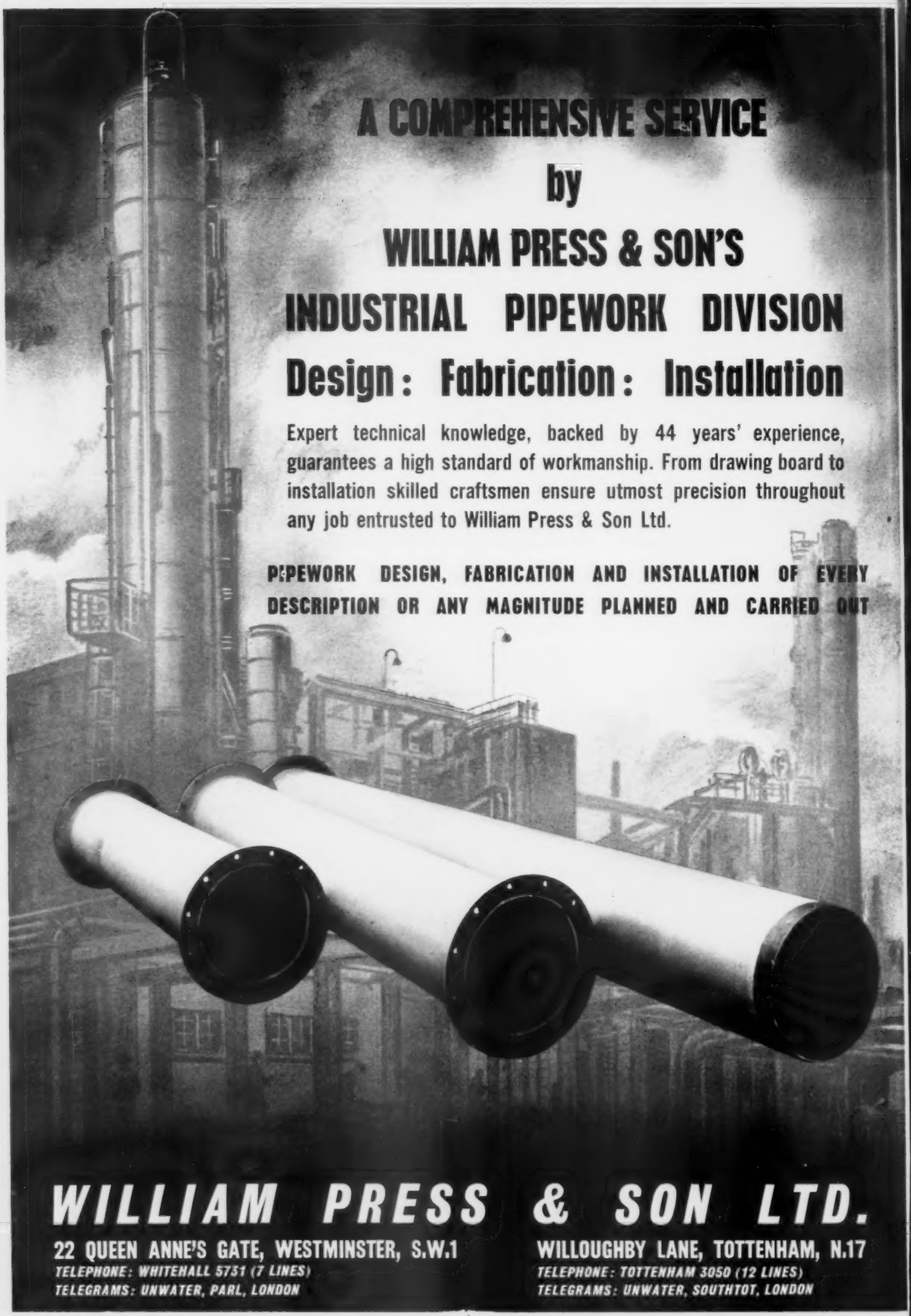

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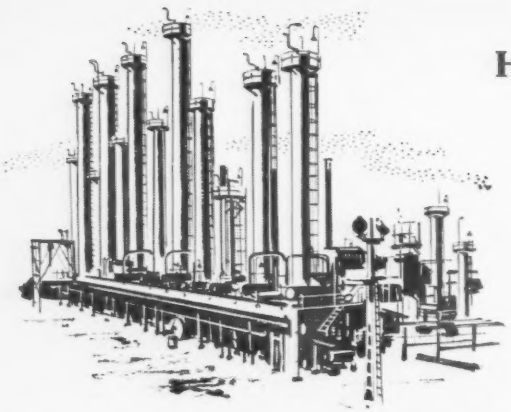

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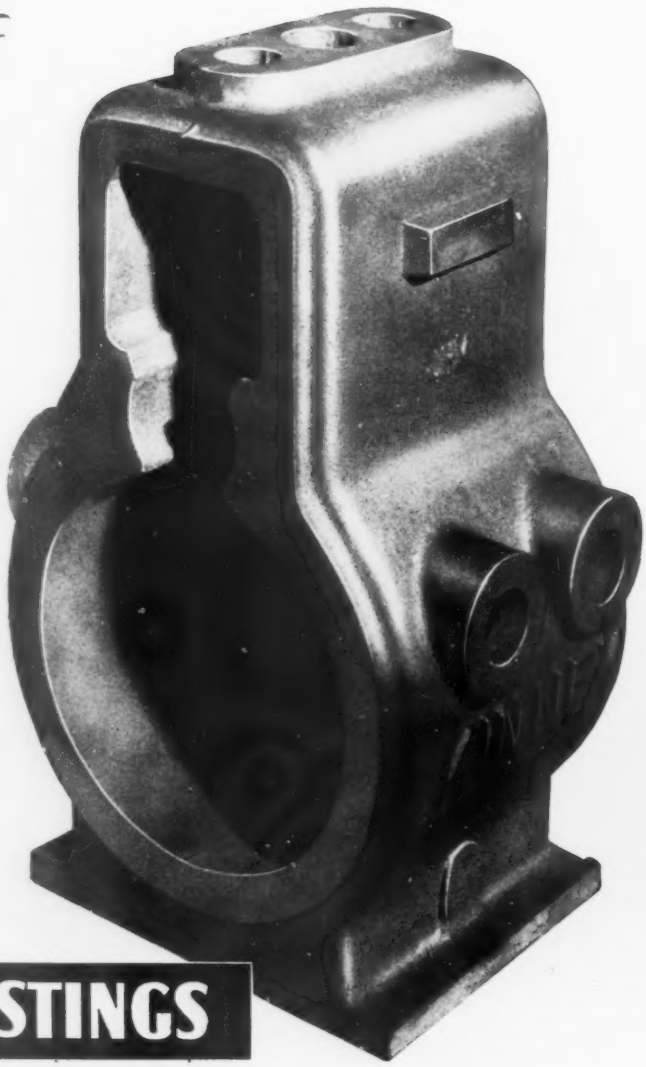

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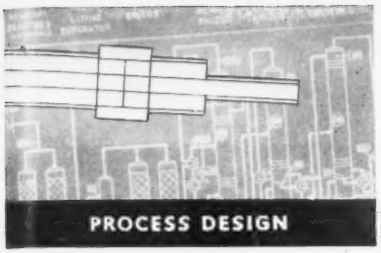
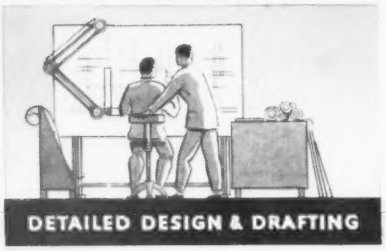

PROCESS DESIGN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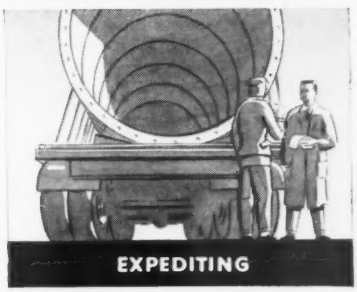
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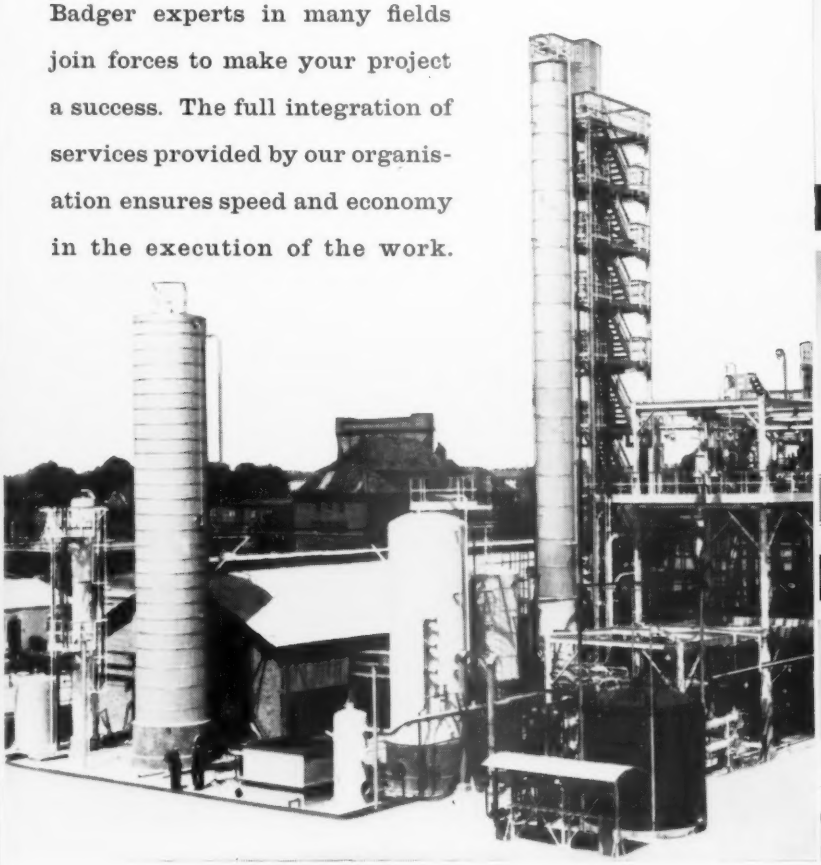
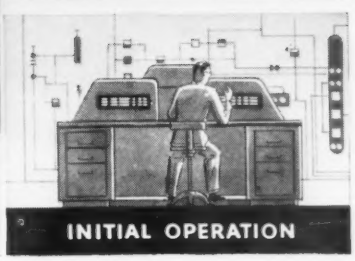


CONSTRUCTION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